C O N T E N T S

THE PROBLEMS

The Solid Waste Management Section of the Indiana State Board of Health has determined that on the average, each person in Indiana produces 1.5 to 2.5 pounds of household waste per day. If commercial wastes are included, the amount goes up to 3 pounds per day, it jumps to 5.8 pounds per day if industrial, agricultural, and demolition wastes are included. With Indiana having a population of more than 5 million people, approximately 15,000 tons of waste are created daily. In Kosciusko County we create approximately 171,000 pounds of waste each day. The solid waste volume for the United States has been estimated to be growing at a rate of three times as fast as our population.

What do we do with all of our waste? There are three solutions: 1) recycling; 2) using the waste to generate energy; 3) landfills.

In Kosciusko County the solution has been landfills. The reasons for this are: 1) economical; 2) limited manpower to operate; 3) controls pollution; 4) quick turnover of waste.

However, there are many problems with landfills. In our county, as well as the state, geological conditions are a major problem. State restrictions require a landfill to have a minimum thickness of relatively impermeable material between the base of the landfill and the shallowest aquifer of 10 to 25 feet, but a 20 to 30 foot minimum is suggested for general use. This means for a 20 foot trench,for landfill use, would require 40 to 50 feet of impermeable soil.

According to an Indiana Geological Survey the southern 2/5ths and a small amount in the northwest corner of Kosciusko County could be suitable for landfills. (See map)

In 1969 the Refuse Disposal Act was passed into law, eliminating open dumps. The Act also created the need for landfills. In 1974 the State sat up guidelines for permitting regulations of landfills. These new regulations, with the use of surface geological maps, caused the phasing out of 23 statewide landfills. The Scott landfill in our county was one of the 23, leaving us with only one, the Ransbottom Landfill in southern Kosciusko County.

The phasing out of the Scott Landfill has created problems for residents of northern Kosciusko County. On March 8, 1982, a public meeting was held at the old Courthouse. The panel consisted of Maurice Dorsey, Fred Gilliam, Jean Northenor. Matt Dalton, Gerald Smalley, and two State Board of Health Representatives, Stu Miller and Larry Studebaker.

A group of concerned citizens from the Syracuse area were the main questioners. The two main questions were: 1) "Why was the Scott Landfill closed?", and 2) "What can be done to reopen or replace the landfill?" The State answer to the first question was that through geological surface maps, the area of the landfill showed permeable soil types, which could lead to pollutants in the water. Their answer to the second question was that four monitoring wells have to be put down at varying depth and in different quadrants of the landfill. This has to be done at the landfill owners expense. If the wells prove that there are

no pollutants then the landfill can be reopened, but if they prove there are pollutants, the State will fine the owner of the landfill.

To replace the landfill a new one would have to be created. To start a new landfill, zoning approval is necessary, and this can be stopped by the surrounding neighbors by protesting the landfill. The costs for a 40 acres landfill are the land, $5,000 to $8,000 for testing, $18,000 for engineering plans, and the cost for core samplings. All of these must be completed before final approval is given by the State.

These costs alone prohibit most people from starting landfills. The County Council has approved money for the purchase of land for a landfill. The County Commissioners and their task force have looked into purchasing suitable land for a landfill. According to Commissioner Gilliam, each time suitable land is found word gets around about the possible landfill and the land is purchased by a private resident, thus eliminating the chance for a landfill.

The need for a landfill in Northern Kosciusko County is real, already the cost for garbage removal has doubled. During the summer season the area population doubles and the permanent residents feel that the summer people will not pay for the garbage removal. If this happens, their trash is going to be left or it will be thrown along the highways.

The Ransbottom Landfill is located at Packerton in the southern part of our county. The landfill is privately operated, employing three full time employees, and two part time. The landfill, consisting of 120 acres, was started in 1971 with an approximate life expectancy of 30 years.

The hours for the landfill are 9AM to 5PM Monday thru Friday, 8AM to 12PM Saturday. Prices for dumping at the landfill are $2.50 per cu. yd; $3.50 per major appliance, and $2.50 per roll of fence. This revenue goes directly to the owner, with no additional money from the State. This money is used for income for the employees, upkeep of machinery, and any additional testing of the land.

The equipment at the Ransbottom Landfill consists of two bulldozers, one earthmover, and one trashmaster. The initial expense of the machinery was approximately $200,000. The owner is responsible for the upkeep of machinery and must have access to backup equipment.

According to Dan Ransbottom, his job consists of continual covering of the trash using the bulldozers; the earthmover is used to stockpile cover dirt to be used in the winter and on rainy days. He also states that when the dumping trench starts filling up, it is necessary to dig new ones. In doing this he has to consider prevailing winds and drainage flow of top water.

Recently new core samplings had to be taken at this landfill. The cost of these samplings are paid for by the owner.

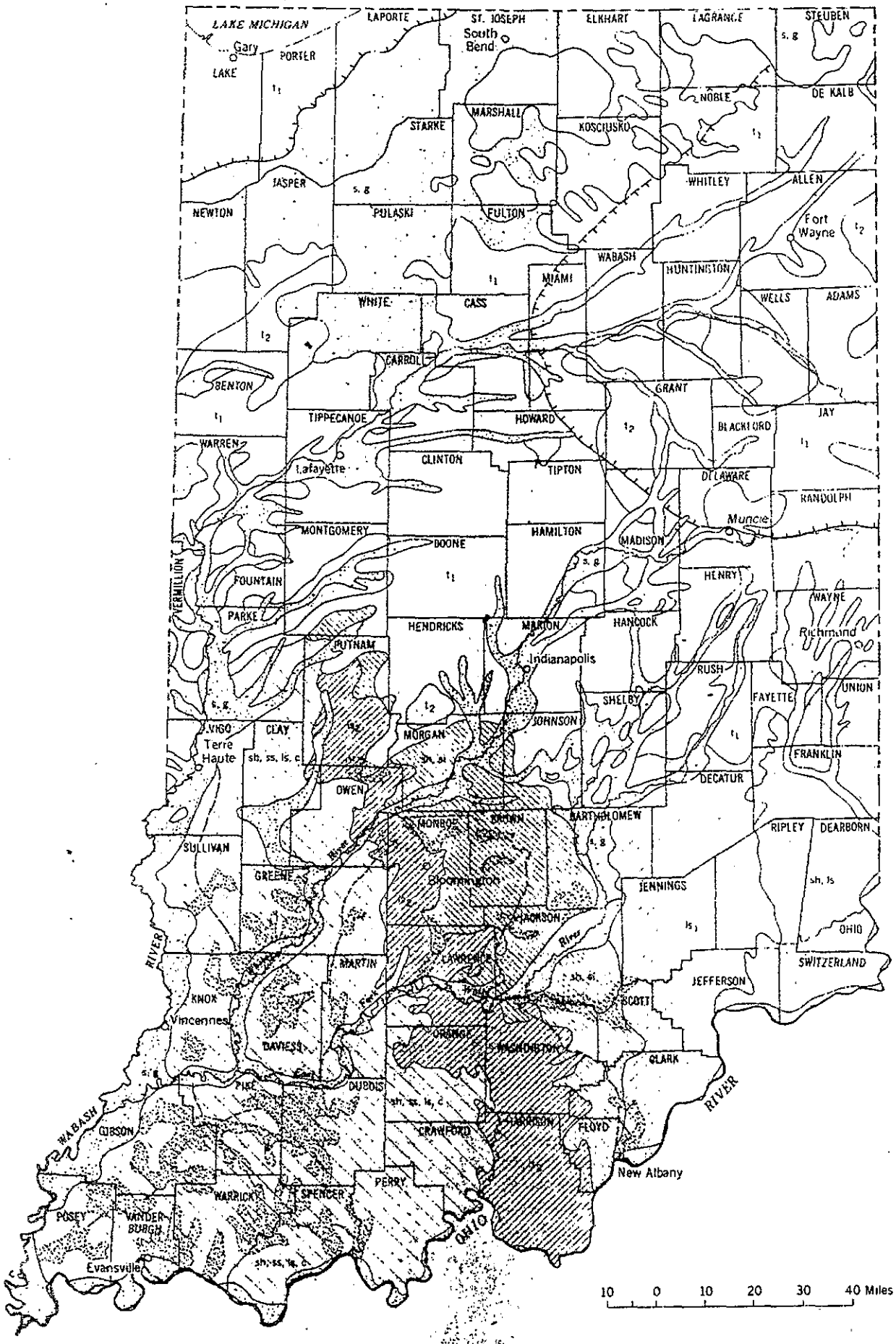

Figure 1. Map showing geologic limitations for solid-waste disposal sites in Indiana. Compiled from Gray, in preparation; Gray, Wayne, and Wier, 1970; Indiana Geological Survey, 1956; Wayne, 1956; and Wayne, 1958.

EXPLANATION

Sand and gravel outwash of glacial origin and dune sand. Excellent essential aquifers are present in most areas, and contamination is a virtual certainty for normal operations. Little suitable cover material is available.

Sandy loams, loams, silt loams, and clay loam till of glacial origin. Scattered essential aquifers are present as interstratified sands and gravels. Sufficient thickness of slowly permeable material may be present above aquifers. Abundant cover material available.

Same as t_1, but less than 50 feet drift over bedrock. Possibly insufficient thickness to guarantee noncontamination of interstratified sand and gravel aquifers or underlying limestone bedrock aquifers. Abundant cover material available.

Shale and limestone bedrock. This material is very slowly permeable and aquifers in it are uncommon. Likelihood of contamination of subsurface water is slight. Locally thicker glacial materials may provide adequate cover material.

Interbedded limestone and dolomite bedrock that commonly is an aquifer in the upper 20 feet. Locally thicker glacial materials may provide adequate cover material.

Shale and siltstone bedrock. No likelihood of contamination of subsurface water exists. The highly dissected and sloping terrain in the slowly permeable material may present surface drainage problems, and adequate cover material is scarce.

Cavernous jointed limestone bedrock. Subsurface drainage to wells and surface is common. Groundwater flow is unpredictable and water is easily contaminated. Bacterial pollutants are easily transmittable. Heavy clay surface soil is a poor cover material, but probably usable where thick enough.

Interbedded shale, sandstone, limestone, and coal bedrock. Scattered essential aquifers are present in sandstone and limestone. Locally high degree of dissection, relief, and slope present surface drainage and general feasibility problems, particularly in the east. Locally thicker glacial materials toward the west may be adequate for cover.

Clay to silt loam of glacial lake origin. Material is very slowly permeable and might be an excellent refuse receptacle, but might be hard to work, might be an unsatisfactory cover material, and might be subject to ponding.

Limits of clay loam to silty clay loam glacial till

Southern limit of upland glacial material

Eastern limit of thick upland silt of windblown origin. Material is similar to glacial lake materials, but less clayey, more workable, and better drained, and might provide excellent receptacles.

THE SOLUTIONS

1. Create new landfills
   - A. Educate the public as to the need for landfills
   - B. Use county funds to aid the landfills
   - C. Public involvement

2. Source Reduction
   - A. This method reduces waste at the point of generation rather than at the disposal point. Examples are:laws to eliminate non-returnable bottles, and to have a deposit on all beverage cans.

3. Source Separation
   - A. Source Separation is the setting aside of recyclable materials (paper, glass, and metal) at their point of generation (home, factory, or office) by the generator.
   - B. Preparation time required approximately 69 minutes per month for all materials. They are broken down as follows: glass- 20 minutes; metal - 30 minutes; aluminum - 6 minutes; newspapers - 13 minutes.
   - C. Costs to the householder for source separation (water for cleaning, electricity, twine for bundling) averages about 2¢ per month.
   - D. Use of this method can save up to 8% of space at a landfill.

4. Recycling

A. Conserves landfills -

Glass = 10% of municipal waste

Paper = 34% of municipal waste by weight and 50% by volume

Metals= 8.5% of municipal waste

B. Reduces Pollution -

Recycled Steel - 86% less air pollution

76% less water pollution

97% less mining waste

Recycled Paper = 74% less air pollution

35% less water pollution

35% less solid wastes in process water

58% less process water generated

C. Conserves Natural Resources -

The United States has run out of manganese (for steel) and bauxite (for aluminum). We must import these from Africa and Asia, but yet we continue to bury equivalent amounts each year.

One ton of recycled paper = 2 trees saved

D. Conserve Energy -

Aluminum takes 30 times the energy to produce as it does to produce recycled aluminum.

60 to 70% energy savings for recycled paper.

Steel requires 2 to 3 times the energy as compared to recycled steel.

E. Social Gains -

Through recycling the public has a sense of involvement in protecting the environment and conserving energy.

MANUAL

FOR

STORAGE, COLLECTION AND SANITARY LANDFILL

SITE SELECTION AND DISPOSAL OF REFUSE

Division of Sanitary Engineering
Indiana State Board of Health

7/80

INTRODUCTION

Today's rapidly increasing population and the enormous amount of waste material produced per year necessitates closer scrutiny and updating of present refuse disposal practices. Increased waste material, coupled with rising costs of collection and disposal, makes it imperative that private citizens and communities face their solid waste problems now and support the development of sound plans for the future.

This pamphlet is intended to serve as a guide for the improvement of storage, collection and the disposal of refuse by the sanitary landfill method. It is intended for use by individuals and municipalities of Indiana with economy and good sanitation in mind. Of paramount importance in any method of solid waste disposal is a sincere regard for the protection of the public's health. For the landfill to be truly effective, the operation must be conducted according to good sanitary refuse disposal practices.

This pamphlet goes into detail on the disposal of refuse by the sanitary landfill method since it can be readily utilized by most of the communities in Indiana. Proper incineration of refuse is usually for larger metropolitan areas where availability of land and haul distances are major factors in the cost of disposal.

STORAGE

Refuse produced in the home or business establishment is the responsibility of the individual until it is collected for disposal. The manner in which this refuse is prepared and presented for collection is an important factor in the effectiveness and efficiency of a solid waste disposal program.

Public disapproval of indiscriminate refuse handling procedures has created a definite responsibility on the part of local governments to define and regulate the handling, storing and placing of refuse for collection. The creation of codes of practice does not guarantee compliance, however, and good practices are usually obtained through public education. Citizens must be convinced that flies, rats and disagreeable odors are unhealthy and undesirable results of improper refuse storage, and that these effects can be prevented.

Sound public health principles dictate that all putrescible refuse be stored so that disease vectors (rats and insects) do not have access to it and so that liquids do not leak from containers. Containers adequate in size and number must be provided to prevent insanitary conditions from developing and to achieve economical and effective collection and disposal. Containers should be kept or placed where they are easily accessible to collectors. Depending upon local collection and disposal methods, separation of classes of refuse may be necessary although with the sanitary landfill, separation is not necessary.

The storage container should be constructed of a strong and non-corrosive material. It should have a tight-fitting lid and be provided with a bail or handles. The container should be of a size and weight, when full, to permit easy handling. For garbage only, the container should be a minimum of 5 gallons capacity and a maximum of 20 gallons. For combined refuse or rubbish, a minimum

of 20 gallons and a maximum of 30 gallons is recommended. Containers should be placed on a rack or stand and kept off the ground surface. The container should be cleaned and disinfected periodically. Draining and wrapping garbage will prolong the life of the container, facilitate cleaning of the container, reduce fly breeding and aid in collection during freezing weather.

Standard containers for storage increases the efficiency of the collection system. A study conducted in several cities showed that to collect and empty three standard size containers required approximately one-third the time it took to collect and empty three different sized containers.

COLLECTION

Refuse collection methods differ widely as a result of varying local requirements and conditions such as climate, habits of citizens, and variations in laws and regulations. Collection practice should receive adequate attention in planning and operation. It is the most expensive phase of a refuse program, often requiring 70 to 80 percent of the total solid waste management budget. The economy and effectiveness of a collection program depends to a large extent upon refuse storage and preparation by the individual home owner. Of primary importance, then, in effective refuse collection is the application of sound engineering planning, securing cooperation of the public through education, and the adoption and enforcement of ordinances and regulations.

The first step in planning a collection program is a survey of existing conditions. The survey should include seasonal records for the following: collection workload for each vehicle and crew, refuse quantities, number of pick-ups, mileage covered, and quantity of refuse by areas. From these data, selection of routes and adjustments in trucks capacities and crews can be made. Adjustments of routes are necessary as municipalities expand and characteristics of areas change. Studies also reveal factors which influence the program, such as the servicing of commercial establishments which may require at least daily collection. It is generally agreed that the minimum number of pick-ups needed to satisfactorily dispose of refuse is one per week. A pick-up of twice per week is recommended for residential areas, particularly during warm months.

The needs of each individual community must be determined, and these needs must be correlated with costs in order to develop an economical and efficient program. Scheduling of pick-ups must be rigid, especially if the home owner must place containers in special locations.

Refuse Collection Equipment

The selection of vehicles for a particular collection operation should involve a complete understanding of local conditions and a thorough knowledge of the kinds, sizes, costs and adaptability of equipment available. In general, collection of refuse in enclosed, compactor-type trucks offers both economic and sanitary advantages over other vehicles in most situations. Compactor trucks with mechanical loading can reduce the manpower burden and increase the quantity of material that can be hauled. Non-compactor and open-body collection vehicles do have some practical applications, especially in collecting bulky items, yard rubbish and tree trimmings. All vehicles must be watertight, covered,

built to resist corrosion and constructed so that they can be easily unloaded.

Conditions of the streets and width of alleys, in addition to the type of service offered, may have an influence on the size and type of collection vehicle used. In general, larger trucks will make less trips to the disposal site and reduce haul time, although their maneuverability may be more limited.

Mechanical compactor loaders are of two general types: batch hopper and continuous belt loader. The batch loader has a hopper which is filled and the refuse is then pushed into the truck body by hydraulic power. The continuous belt loader utilizes a conveyor belt to lift materials into the truck where they are compacted by a special mechanism.

Collection services, and the equipment needed to perform these services, will vary with seasonal and yearly demand, expansion of population and amount of refuse produced. Practices must be reviewed periodically and adjustments made or equipment added when necessary.

SANITARY LANDFILL DISPOSAL

The sanitary landfill is a planned and systematic method for disposing of refuse by compacting and covering with earth. To be effective, the landfill must be operated as an engineering project. When properly planned and operated, the sanitary landfill can benefit the community both economically and from a public health standpoint by:

1. eliminating odor, smoke and fire nuisances;
2. eliminating mosquitoes, rats, flies and other disease-carrying vermin;
3. lowering disposal costs by enabling:
   a. combined garbage and rubbish collection
   b. material variations in quality and quantity without special operating problems.

Site Selection

Selecting a suitable location for the land disposal of solid wastes involves a great deal of planning and responsibility. Before a sanitary landfill can be established, its potential impact upon the physical, political, economic and social elements of the surrounding community must be carefully considered. The following general questions may aid you in making the proper decisions in establishing a waste disposal facility and will hopefully smooth the path from drawing board to operation.

1. Is there a need for a landfill in the proposed area?

   This question should be the initial concern of all prospective landfill owners/operators. The question is primarily one of economics and the answer lies in considering the population of the area, the volume of waste that is generated within the area, and the existence of other nearby landfills.

2. Will the site be located near adequate sources of waste?

   This question is related to No. 1. A landfill must normally be located within an economically attractive hauling distance of major waste sources (i.e., population centers) to be successful, especially when other disposal sites may be operating within the same area.

3. Is the site geologically suitable?

   This question is a basic concern from the point of environmental protection. Geologic factors commonly considered are:

   a. Soil type: Thick sequences of an impervious material (such as clay, shale, or a clay/silt mixture) are highly desirable and serve to contain polluted water within the immediate vicinity of the refuse. Under very few circumstances disposal within sand or gravel or in areas where sand and gravel are very shallow will be permitted.

   b. Depth to water-bearing zones: Shallow saturated zones that may be used as sources of water or that may be continuous with other zones tapped for water must be shielded from pollution by an adequate thickness of overlying impervious material. If such zones are close to the ground surface, the proposed site may be ruled unacceptable.

   c. Severeness of topography: Steep slopes may pose drainage and erosion problems, limit the effective use of equipment, and reduce the amount of usable land. Examining a USGS topographic map of the area may be useful.

   d. Location of the site with respect to local surface drainage systems: A landfill cannot be located within the 100-year flood elevation of a stream or river without prior written approval of the Department of Natural Resources. If the stream discharge is 5 cubic feet per second (cfs) or greater, approval from the U. S. Army Corps of Engineers will also be necessary. In addition, proximity to a stream often suggests the presence of sand and gravel within the subsurface which may limit the amount of usable acreage.

4. Are there private dwellings nearby?

   Stream Pollution Control Board Rule 330 IAC 4-1, et seq., the current regulation controlling solid waste disposal, stipulates that waste disposal shall not be conducted within 600 feet of any dwelling without written consent of the owner and occupant. This restriction refers to the location of the actual disposal area and not to the proposed landfill property boundaries. This requirement must be carefully considered when locating a landfill in order to maximize the amount of available land.

5. Is the site readily accessible by hard-surfaced all-weather roads?

Accessibility of a site to the public is important. Furthermore, all roads commonly used for travel to and from a landfill must be capable of withstanding the physical stresses imposed upon them by heavy vehicles. If possible, major routes to a site should avoid residential areas.

6. Can proper land-use zoning be obtained?

   This possibility must be investigated very early within the landfill-planning process. Much time and money are often spent on extensive site preparations only to be lost when proper zoning cannot be granted from the county or municipality in which the landfill is located. Zoning approval is often a function of proper site location, sound engineering, conscientious operation, and the consideration of public health. A well-planned landfill is thus in your best interest.

7. Will the site be aesthetically acceptable?

   Operating a landfill that does not offend the public's aesthetic sense is required by law, and it will usually result in better rapport with the community. Practices such as controlling blowing paper, shielding the site from public view (usually by leaving tree stands in place or using topography), applying daily cover to reduce odors and vectors (this practice is required), etc., usually result in public support instead of opposition.

Once a proposed site has been located and has successfully met these seven initial considerations, the Solid Waste Management Section will conduct a more thorough study which will include an on-site inspection and a detailed geologic investigation. If the site still looks promising at this time, the Solid Waste Management Section will recommend preliminary soil-boring locations on the property so that the subsurface environment may be accurately defined. Additional borings may be necessary at a later date if questions as to the site's suitability still remain.

At this time within the planning process, it is advisable that you retain an engineer to develop site construction plans and operating procedures in accordance with the specifications outlined in Rule 330 IAC 4-1, et seq. These plans, when completed, are to be submitted to the Solid Waste Management Section for review and approval before any site preparations begin. If the plans are approved, a construction permit will be issued and preparation of the landfill for operation may proceed. Before wastes can be accepted, the prepared site must undergo a final inspection and will be granted an operating permit if it is found to be suitably prepared. This operating permit must be renewed every two years, at which time updated construction plans must be submitted to the Solid Waste Management Section. The operating permit is also subject to revocation or may not be renewed if the operation of the landfill during the preceding period is found to be unacceptable by the prevailing standards.

The Solid Waste Management Section is interested in establishing environmentally sound landfills within the State of Indiana and the staff is available to offer you guidance at any point within the landfill-planning process. If you have any questions during this time, please feel free to contact us for advice.

Operation

Details in the operation of a sanitary landfill will vary with existing conditions, but basically there are two methods of operation: trench and area. The method selected will depend upon such factors as subsurface conditions, drainage and topography of the land. The trench method should be used if the available land is relatively level, while with hilly or rolling terrain the area method, or a combination of the two, may prove more desirable.

Of importance in the operation of any site is the need for adequate supervision. Whenever possible, the site should have regulated times for disposal, and during these times the site should be supervised by at least one employee. The area should be completely enclosed in order to prevent indiscriminate dumping. The time period selected for disposal will depend upon the size of the working face which must be covered before the end of the normal working day. The landfill operation period may arbitrarily be established from 8:00 a.m. to 3:30 p.m., and adjusted accordingly with the time required for covering the working face and for performing routine preventive maintenance on equipment. Signs must be placed at the site entrance to inform the public of operating hours and such other restrictions or regulations which are to be followed for operational control.

Trench Method

The trench method (see Figure 1) is used when level ground is available and has two main variations: cut-and-cover and progressive excavation.

In the "cut-and-cover" method, a trench about 8 feet deep (allowing for 2 feet of cover material) is excavated on the windward edge of the site and perpendicular to the prevailing wind direction to minimize the scattering of paper. The width of the trench should be about two times the width of the crawler tractor to allow for maximum compaction. Trenches are usually parallel to each other and cover material is obtained either from excavation of the trench or from the trench adjacent which will be filled next. Trenches should not be dug closer than 2 feet from the preceding trench, and a final compacted cover layer of at least 2 feet should be applied to the compacted refuse.

In the "progressive excavation" method, trenches are dug as in "cut-and-cover" but cover material is excavated from the area directly in front of the working face of the landfill and is put over the previously compacted refuse directly behind it. Cover material is excavated as needed and the process goes on continuously. This method may result in problems during wet weather periods or in winter.

Area Method

The area method, sometimes called the "depression method", utilizes man-made or natural depressions in topography. Refuse is deposited into the area in sloping layers, spread and compacted, and covered with material obtained from adjoining slopes or the bottom of the working face. The fill is usually constructed so as to form strata or cells from 4 to 20 feet in depth as shown in Figure 2. Each layer should be covered daily with at least 6 inches of cover material, and a final compacted cover layer of 2 feet applied.

The area method requires careful planning and a thorough consideration of such factors as stability of slope, distance to cover material, drainage, and the possibility of surface and underground water pollution.

In either method, trench or area, maximum compaction should be obtained in order to reduce settlement of the area, permit even settlement, and reduce the volume of refuse to conserve land usage. Cover material should receive an equal amount of compaction to eliminate insect and rodent infestation, control settlement, prevent surface water entrance, and produce a satisfactory surface upon completion of the landfill. The steel tracks of a crawler tractor are well suited for this job, and routing trucks over completed portions of the fill can provide additional compaction. Refuse should be covered daily with at least 6 inches of cover material, and the final cover layer should be at least 2 feet in depth after compaction. A completed fill should have a minimum of one percent slope to allow for proper drainage.

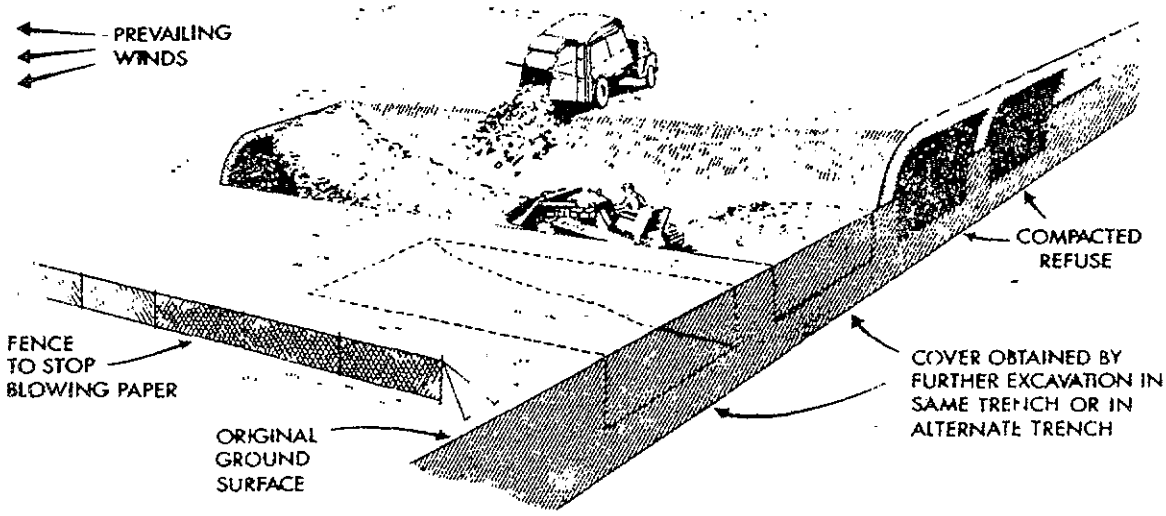

Figure 1--Trench Method

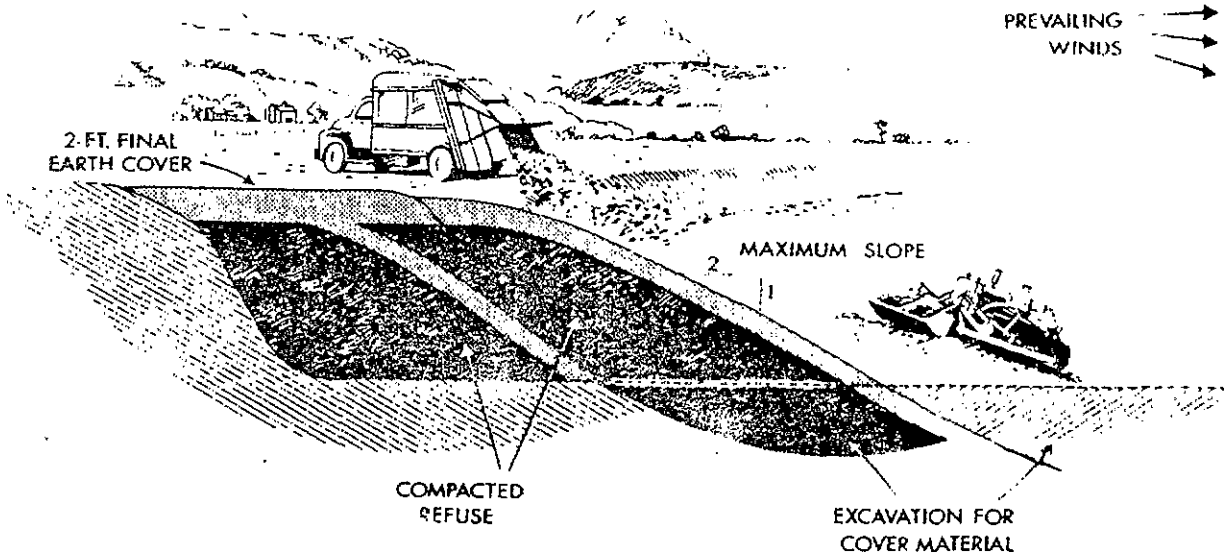

Figure 2--Area Method

Equipment

The equipment required to properly operate a sanitary landfill varies with such factors as fill method used, amount of refuse handled, and physical characteristics of the site. Each site must be studied to determine the basic equipment needed for preparation, daily operation and special situations. Other factors such as drainage, terrain, length of haul of cover material, and type of cover material must also be considered in selecting equipment. Standby equipment must be available to permit uninterrupted operation in the event of breakdowns.

Types of Equipment

Basic equipment needs for a landfill operation are for excavation, covering, compaction, and grading. For most cities up to 50,000 population, crawler-type tractors fitted with a bucket attachment are sufficient. Landfills serving larger cities may require additional or specialized equipment such as drag lines, power shovels and earth movers.

Thorough investigations and cost comparisons should be made to determine what equipment is most economical and functional. Wheeled units may be considered if haul distance for cover material is long and the adaptability of equipment to other public works is worthy of consideration.

Special Problems

To obtain maximum usefulness and efficiency, several special problems which are often encountered should be considered and dealt with. Winter operations may cause problems; therefore, it is necessary to make excavations before freezing and to stockpile and protect cover material. During wet, rainy weather it may be necessary to have access to an alternate site or to make special provisions for aiding the maneuverability of trucks and equipment.

Dust is often created by moving trucks, and oiling or wetting the site may be desirable. Odors can usually be controlled by continuously covering freshly deposited refuse. Accidental fires should be controlled by spraying with water or smothered with earth. A source of water should be available to the site. Surface and ground water pollution can be avoided by applying engineering practices to the location and operation of the landfill.

Fencing should be used to control blowing litter. Inspection of the completed site should be maintained until the fill becomes stabilized so as to ensure prompt repair of depressions, cracks and erosion of the surface and slopes. Quantitative records should be kept on refuse deposited in order to adequately plan for land usage.

If salvaging is permitted, it should be [illegible]ly supervised and not allowed to interfere with normal operation. Salvaged material should be removed from the site daily.

Several sanitary landfill operations in the State of Indiana have attempted to salvage metals, periodically hauling them to a salvage market. The Indiana

State Board of Health has not objected to separating metals for recycling; however, poorly controlled salvaging methods have caused operational difficulties for the primary operation being conducted at the sanitary landfill. Large, accumulated piles of metal have caused vehicular hindrance, harborage for rodents, and an unsightly appearance of the landfill.

A few operations containerize the metal in a transportable enclosure. When the container is full, it is immediately hauled to the salvage yard. These transportable devices include semi-trailers, other types of truck beds, roll-off containers, etc., to facilitate acceptable storage and expedite removal from the site. This method of proper handling of salvageable materials makes operating a sanitary landfill and salvaging compatible.

Operations which are presently salvaging metals (or any other salvageable materials) or considering such an operation, are requested to initiate the use of the transportable container. The container satisfies the requirement that materials cannot be placed on the ground without daily cover and eliminates operational and aesthetic problems associated with poorly managed salvaging.

Dead animals, entrails and truck loads of spoiled foods should be placed in a separate trench or pit and covered immediately after unloading. Liquid wastes and industrial wastes should not be placed in a landfill without prior approval of local health department, the Indiana State Board of Health and/or the Stream Pollution Control Board.

Open burning--Under no circumstances should the open burning of refuse be permitted on the landfill area. It endangers lives since it is possible that refuse will contain such items as toxic and explosive materials, ammunition, and aerosol containers. In addition, fire and health hazards are created. Nuisance complaints, associated with solid waste disposal, often originate as a result of burning.

Special conditions may require the burning of certain wastes. This burning must be accomplished at a separate site remote from the landfill and in an area where hazards and nuisances will not be created and only when wind and atmospheric conditions are favorable, and only with approval of the Air Pollution Control Board. An overfire pit incinerator may be utilized for some types of wood debris.

Working conditions--Drinking water and toilet facilities should be available at all sanitary landfill operations.

Use of Completed Landfills

A properly conducted and completed sanitary landfill can be a valuable asset to a community. Completed landfills may be used for such things as parks, playgrounds, golf courses, parking areas, landing fields, or shallow root agricultural crops and, with special construction precaution, for light industrial or commercial buildings. The locations and planned uses for landfill sites should be considered in the overall planning for a community's growth and development.

GETTING RID OF THE OPEN DUMP

Open dumps are unsightly, objectionable and definitely hazardous to the public's health. They should be covered as soon as possible, and consideration given to the use of a sanitary landfill or some other suitable method of solid waste disposal. It can be advantageous to a community to close the open dump by following these five basic steps:

1. Eliminate rats and vermin before covering any material; otherwise they will just move on to populated areas;

2. Place existing refuse into windrows;

3. Excavate a trench and place refuse in trench;

4. Compact the refuse;

5. Cover the refuse with compacted earth.

SUMMARY OF STATE AND FEDERAL LEGISLATION REGARDING SOLID WASTE MANAGEMENT

INDIANA LEGISLATION

Refuse Disposal - IC 19-2-1

Authorizes counties, cities and towns to establish, acquire, construct, install, operate and maintain facilities for the collection and disposal of refuse. Collection and disposal facilities may be financed by revenue bonds. Also, counties, cities and towns are authorized to contract for the collection and disposal of refuse; to make appropriations for the establishment and operation of collection and disposal facilities or services; and to lease, with option to purchase, an incinerating or other disposal facility. Counties, cities and towns may contract with each other or with commercial organizations for collection and disposal services and facilities. Open dumps are prohibited.

Refuse Disposal Facilities - IC 19-2-6

Authorizes cities and towns to establish and maintain facilities for the collection and disposal of refuse; to contract with other governmental agencies or private contractors for the collection or disposal of refuse; to secure the collection and disposal of refuse accumulated within or without the corporate limits of such municipality or county wherein said municipality is located and to issue revenue bonds to pay in whole or in part the cost of such facilities. Authorizes reasonable service charges. In executing any or all of the powers and duties, as aforesaid, such cities and towns may do so either directly or by contract with other governmental agencies or private contractors.

Refuse Disposal, Marion County - IC 19-2-24

Concerns the collection and disposal of garbage and wastes in all counties wherein is situated a city of the first class having a department of public sanitation. Authorization is given to the common council of such city to enact ordinances to control and regulate the disposal of refuse in any area not exceeding ten miles from the corporate limits of such city or the limits of the county in which such city is located.

County Sanitation Ordinances - IC 17-2-22

Authorizes the board of commissioners of any county to adopt ordinances to regulate and establish minimum sanitary standards for food establishments, disposal of sewage by private methods and disposal of garbage and rubbish--all outside the corporate limits of cities and towns.

Interlocal Cooperation of Public Agencies - IC 18-5-1

Permits local government units to make the most efficient use of their powers by enabling them to cooperate with other agencies on factors influencing the needs and development of local communities; provides for the appropriation of funds for operation of the joint or cooperative undertaking.

Litter Control - IC 14-3-11

Sets penalties for unlawful disposal of refuse. Makes it unlawful to dispose of refuse within the limits of or adjacent to any public highway, state park, or recreation area, or in or adjacent to any lake or stream. Provides for enforcement by peace officers and conservation officers of the Department of Natural Resources.

Watercraft--Sewage and Litter - IC 14-1-1

Removes the exemption of Lake Michigan regarding the prohibition of discharge of sewage from boats. Provides for the use of holding tanks, incinerators or treatment systems which are approved by the Stream Pollution Control Board.

Abandoned Vehicles - IC 9-9-1

Provides authority and procedure for cities, towns and counties to more easily dispose of abandoned or junk vehicles. Provides in cities of the first and second class for removal from public and private property of abandoned vehicles by law enforcement officers; provides a procedure for disposal of such vehicles and assessment of costs of removal, storage and disposal against the last owner; and requires suspension of any operating license and registration certificates of such owner until the costs have been paid.

Sanitary Landfill Operations - IC 17-2-24

Authorizes counties to employ persons, vehicles and equipment to dispose of solid waste.

Restricts Junkyards - IC 8-12-1

Restricts establishment and maintenance of junkyards (and sanitary landfills) in areas adjacent to interstate and primary highways. Persons may not operate a junkyard any portion of which is within 1,000 feet of the nearest edge of a right-of-way of any interstate or primary highway. Includes scrap metal processing facilities in those businesses which are controlled.

Cooking of Garbage Fed to Swine - IC 15-2-5

Controls and regulates the collection, transportation and cooking of garbage to be fed to swine. The objective is to more adequately control the spread of animal diseases and to protect the public health. Garbage must be heated to a boiling point of approximately 212° F. and held at such temperature for at least 30 minutes. The act does not cover persons who feed garbage from their own households to their own swine. Administration is by the State Board of Animal Health.

Jasper--Garbage Grinders - IC 19-2-8

Enables cities and towns to finance the installation of garbage grinders in private residences, business places, or any other building within or without the city limits, providing that the city owns, operates and maintains a sewage treatment plant. This financing may be done by revenue bonds.

Environmental Management Act - IC 13-7

Created the Environmental Management Board to provide for evolving policies for comprehensive environmental development and control on a state-wide basis.

a. Indiana Stream Pollution Control Board Rule 330 IAC 4-1, (Regulation SPC 18), Solid Waste Management Permits, August 15, 1974.

   Provides standards for the approval of refuse processing and disposal facilities.

b. Indiana Stream Pollution Control Board Rule 330 IAC 4-10, (Regulation SPC 17), Industrial Waste Haulers Permits, December 9, 1974.

   Liquid industrial waste haulers are required to obtain permits to remove, haul and dispose of liquid industrial wastes.

The act also addresses generation, storage, transportation and disposal of hazardous wastes.

Regional Solid Waste Management Planning - IC 19-3-1

Any area in the state may be organized as a regional water, sewage and/or solid waste district to provide for the collection, treatment and disposal thereof.

FEDERAL LEGISLATION

Resource Conservation and Recovery Act of 1976

Provides for technical and financial assistance for the development of management plans and facilities for the recovery of energy and other resources from discarded materials and for the safe disposal of discarded materials, and to regulate the management of hazardous waste.

THE FUTURE OF INDIANA SOLID WASTE MANAGEMENT PLANNING

The major emphasis in the solid waste field across the country is the coming age of resource recovery. Amounts of recyclable materials are gradually increasing. Technology and markets will reach a point where costs for handling recycled materials can be met by the sale of those materials. Currently recycling centers are still in the preliminary or experimental stage, with a tendency towards high operational and maintenance costs and low returns on the sale of the recycled materials. Sanitary landfills are now the cheapest acceptable means of refuse disposal; however, landfill costs are increasing due to increased costs of real estate, equipment, salaries and fuel. The costs of operating recycling centers will gradually decrease. In a few years recycling centers may be less expensive to operate than sanitary landfills. Reuse of what is now "waste" will prevail over disposal.

To prepare for the advent of the recycling centers, it is expected that planning for solid waste management will provide for regional solid waste processing centers. A four, five or six county area could be managed as a unit using county-wide collections systems, transfer stations, and centralized recycling centers.

With a few exceptions, each county in a region would be responsible for its own refuse collection and hauling to a centrally located transfer station. Transfer trailers would then haul compacted refuse to the regional recycling center, which should be conveniently located to all members of the region and near potential customers of the recycled materials. All revenues from the sale of recycled materials would be returned to the various members of the region proportionate to the amount of materials generated.

The people concerned with the local situation should begin now to obtain information and data relative to how these trends and developments will affect cities, towns and counties, and what can be done to fit into the solid waste management programs of the future. Energy conservation is of utmost importance and new and more efficient methods of solid waste handling and resource recovery will be of benefit in this area. There are many volunteer recycling centers around the state which may be expanded with additional local support. Also, the secondary materials operators and dealers around the state may be able to modify their operations to make them more compatible with local or regional needs as the prices of recyclable materials become more advantageous. One type of activity in which we would encourage each local governmental unit to participate is to evaluate the systems of refuse collection now in use. Refuse generation rates on both volume and tonnage basis, fuel usage, total mileage by each collection vehicle, and total costs involved, are among the basic data which should be obtained. The data will be very helpful toward establishing the regions for solid waste management to best serve each local governmental unit.

If you have any comments or questions relative to this matter, contact the Solid Waste Management Section, Indiana State Board of Health, at 317/633-0176.

CITIES KNOWN TO HAVE SOURCE SEPARATION RECYCLING

ANDERSON

a. Shady Side Park Source Separation Project. Began in 1975. Recycle glass, aluminum cans, newsprint.

Contact: Reggie Dunkan
707 Alexandria Pike
Anderson, IN 46012
317/646-5763

b. Maco Beverage. A beer distributor that purchases aluminum cans and other aluminum scrap. Drop off Thursday 12-4 p.m.

Contact: Terrence Smith, Manager
1803 Columbus Avenue
Anderson, IN 46016
317/644-6122

BLOOMINGTON

a. Good Earth Compost Co., Inc. Private operation. Project began in early 1973. Composting leaves, barn bedding, sewage sludge from Bloomington's North Wastewater Treatment Plant, grass clippings, and sawdust. Compost currently $50/ton.

Contact: Walter Harless
791 E. Empire Road
Bloomington, IN 47401
812/824-7928

b. Stone Belt Center for Retarded Children. Project began early in 1972. Citizens bring paper (all grades) and glass to be recycled. Mentally handicapped adults process material.

Contact: Mrs. Burton, Director
Stone Belt Center for Retarded Children
Bloomington, IN 47401
812/332-2168

BRAZIL

a. Clay County Association for Retarded Children. Began in 1975. Recycles cardboard and newsprint.

Contact: John Olsen
Clay County Learning Center
800 W. Jackson Street
Brazil, IN 47834
317/569-2076

GREENCASTLE

a. Putnam County Learning Center. Operated since 1973. Recycles newsprint.

Contact: Chuck Schroeder, Executive Director
Putnam County Learning Center
Box 504
Brazil, IN 46135
317/653-4400

b. Greencastle Recyclers of Waste. Recycle glass and aluminum. Receives manpower assistance from Putnam County Learning Center.

Contact: Lucinda Maron
317/653-6686
317/653-4213

INDIANAPOLIS

a. Gregory and Sons Recycling. One block west of the main entrance to the Speedway track. Hours: Thursday, Friday and Saturday, 9 a.m. - 5 p.m.

Contact: Gregory and Sons Recycling
4940 Crawfordsville Road
Indianapolis, IN 46224

JASPER

a. RSVP - a group of retired persons. Accepts only aluminum cans, foil or pie pans. Open 9 a.m. - 3 p.m. on Tuesday and Saturday. Loading dock is on East 9th Street.

Contact: RSVP
806 N. Jackson Street
Jasper, IN 47546
812/482-3221

b. Jasper Youth Center. Recycles newsprint by monthly drives. Volunteer pick-up and operation. Loading dock is on East 9th Street.

Contact: Jasper Youth Center
Jasper, IN 47546
812/482-5120

KOKOMO

a. Americas Recycling. A new recycling program to begin very soon.

Contact: Scott Rogers
1201 S. Buckeye
Kokomo, IN 46901
Home - 317/452-7801
Office - 317/963-6999

LAFAYETTE

a. Lafayette Recycling, Inc. Began in 1974. Central collection center recycles glass, aluminum, tin, newsprint, and corrugated soon.

Contact: Doug Paprocki
1240 Sunset Drive
Lafayette, IN 47905
317/474-5067

Mrs. Bernadette Firnan
1108 Salem Street
Lafayette, IN 47904
317/742-0458

Mailing address: P. O. Box 2296
West Lafayette, IN 47906

MUNSTER

a. Region Recycling, Inc. This was formerly Munster Recycling, Inc. Located on American Brick Frontage Road. Open Saturdays 9 a.m. - 12 noon.

Contact: Region Recycling, Inc.
9501 Calumet Avenue
Munster, IN 46321
219/836-5337

NOBLESVILLE

a. Noblesville Recycling Center is operated by the Senior Citizens Group. They recycle glass (green, amber and clear), newsprint, aluminum and catalogs. Center is located on Mulberry between 8th and 9th Streets.

Contact: Senior Citizens
2424 E. Conner
Noblesville, IN 46060
317/773-6904

Marge Land
317/773-0534

SPEEDWAY

a. Town of Speedway has an unmanned center that recycles glass (clear, green, amber), tin, aluminum cans, newsprint

Contact: Speedway Town Hall
1450 N. Lynhurst Drive
Indianapolis, IN 46224
317/241-2566

Jane Wilson
317/241-0748

TERRE HAUTE

a. Terre Haute Recyclers of Waste, Inc. (THROW). Operated since 1976. Recycles newsprint, corrugated, glass, aluminum, ferrous cans, plastics.

Contact: Tom Kinnane
960 Poplar Street
Terre Haute, IN 47807
812/232-1537

WABASH

a. Izaak Walton League. Has four unmanned satellite collection centers that are picked up daily. Collect glass, paper, aluminum, ferrous cans, plastic. Main center located in city-owned building.

Contact: Izaak Walton League Information Center
541 W. Maple
Wabash, IN 46992
219/563-1331
219/563-1390

For more information, contact Karen E. Nelsen of the Solid Waste Management Section, Indiana State Board of Health, 1330 West Michigan Street, Indianapolis, IN 46206 - 317/633-0176.

RECYCLE HOTLINE

317/633-3803

Call this telephone number to find the recycling center nearest your home.

The RECYCLE HOTLINE people can also inform you of the days and hours of operation, the types of materials (paper, metal, glass, etc.) that each center accepts, and whether payment is available for your separated materials.

REFERENCES

1. Muncipal Refuse Disposal, American Public Works Association, Interstate Printers and Publishers, Danville, Illinois, 2nd Edition, 1966

2. "Planning A Sanitary Landfill", Caterpillar Tractor Company, Peoria, Illinois

3. "Questions and Answers About Sanitary Landfills", Caterpillar Tractor Company, Peoria, Illinois, 1953

4. Refuse Collection Practice, Committee on Solid Wastes, American Public Works Association, Interstate Printers and Publishers, Danville, Illinois, 3rd Edition, 1966

5. "Sanitary Landfill", unpublished manuscript by John M. Bell, Assistant Professor of Sanitary Engineering, Purdue University, West Lafayette, Indiana

6. "Where Does It Go From Here?," Caterpillar Tractor Company, Peoria, Illinois

7. "You Take It Out", Bulletin S. E. 12, Indiana State Board of Health, 1953

8. Course Manual, "Elements of Solid Waste Management", U. S. Department of Health, Education and Welfare

9. "Sanitary Landfill Facts", U. S. Department of Health, Education and Welfare, PHS Publication No. 1792, U. S. Government Printing Office, Washington, D. C., 1968

10. "Geological Considerations in Planning Solid Waste Disposal Sites in Indiana", State of Indiana 1970

11. "A Guide to Recycling", Indiana State Board of Health 1979