

CITIZENS LEAGUE REPORT

TAKING THE WASTE OUT OF MINNESOTA'S REFUSE

A proposal to discourage waste generation,
improve refuse handling, and encourage the recovery
and the use of energy and materials from refuse

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INTRODUCTION

This report is addressed to fundamental decisions, which are now being deliberated and made for this region on the management of solid waste. How these decisions are made will affect refuse disposal procedures and costs for years to come. While the decisions concern long-term basic problems, the point of commitment may approach rapidly.

At this point, there are three major, potentially conflicting proposals that have been developed to build plants to use refuse as a fuel to produce energy. A plan by the Metropolitan Waste Control Commission (formerly the Sewer Board) to use shredded refuse for energy to burn sewage sludge is the furthest along. The Commission hopes to start construction on its proposed facility for the metropolitan plant at Pig's Eye Lake in St. Paul in January, 1976. This is followed by Hennepin County and a private group, which have each developed plans to use a refuse incinerator to generate steam. Hennepin County has made its proposal public, and is now soliciting public reaction. The private group has informed the Metropolitan Council of its plans to produce steam from refuse for use by the Hoerner Waldorf Corporation at its St. Paul midway plant.

Other pending decisions include possible state legislation on the generation of waste from beverage containers, and a referendum in St. Paul to allow a mandatory refuse collection ordinance. The carbonated beverage container issue, generally referred to as "ban the can", carries over from the 1975 portion of the current biennial legislative session as being one of the most contested unresolved issues. In St. Paul a petition for the refuse collection issue is to be submitted to the voters in referendum, before a council-passed ordinance can go into effect.

The report attempts to explore these and other related issues as they fit into the entire solid waste stream from waste generation to final disposal. The report focuses particularly on the problems of solid waste management in the seven-county metropolitan area, but recognizes the varying scope of different aspects of solid waste.

MAJOR IDEAS

1. The problem of solid waste today is waste:
 - * Wasted materials and energy in consumption patterns
 - * Inefficiencies in refuse collection
 - * Wasted potential material and energy value of refuse placed in landfills
2. Many of us may not be aware, but fundamental changes in handling solid waste are beginning to emerge. The changes of the last several years, when open burning was outlawed and open dumps gave way to landfills, are but a prelude.
3. The next changes will recognize rubbish as a resource to be utilized, not as solid waste to be discarded. Refuse will not be buried without first extracting its material and energy resource potential. In effect, landfill will give way to controlled incineration as a primary means of disposal. Meanwhile, more emphasis will be given to reducing the amount of waste generated by consumers and businesses in the first place.
4. The greatest interest and activity in the Twin Cities area today centers on three major proposals to recover resources from solid waste before final disposal in a landfill. Thus, there is little need to stimulate interest in capturing the economic value of waste products. The immediate challenge for the Twin Cities area is to avoid costly mistakes. Resource recovery facilities have met with mixed success, at best, in other parts of the nation and in other countries. The most common proposal--which is true for those pending here--is to "burn" the refuse in such a manner as to produce a marketable energy source. The cost for such a facility runs into the tens of millions of dollars.
5. While interest in resource recovery here is high, the Twin Cities area is not faced with an immediate crisis. Landfills, despite several unanswered questions as to their long-term viability, are not so undesirable an alternative as to require their immediate discontinuance.
6. The Twin Cities area does not need to invest tax dollars or general obligation bonds in resource recovery facilities at this time. Sufficient interest is apparent by groups with other financing sources to assure adequate exploration of the potential of resource recovery.
7. We believe the Metropolitan Council should be given approval authority over resource recovery facilities and that it give first priority to proposals from private organizations, second priority to those of public agencies for which no tax support would be required, and lowest priority to public projects for which tax support is necessary or needs to be pledged. The Council ought not take action on any single resource recovery proposal without comparing that proposal with others which may be pending.

. I N O U R R E P O R T

8. Recovering resources after the waste has been discarded is, of course, essentially a corrective action. The amount of waste initially generated should be reduced, which, of course, cuts down on the need for resource recovery. Americans generate unnecessary amounts of waste, twice as much per capita, for example, as other Western industrialized nations.
9. The ultimate disposal cost of products and their packaging is not covered in their initial production. Of course, the potential costs to future generations, such as ground-water pollution and material shortages from burying refuse, are not reflected in the price of products. In fact, some public policies, such as transportation rates, discriminate against conservation and re-use of materials by charging higher rates for scrap, which can be re-used, as against virgin materials.
10. To correct for these deficiencies Congress should assure that scrap materials are treated equally with virgin materials, that products be coded for easy separation for recycling purposes, that the prohibition on re-usable liquor containers be lifted, and that standard, re-usable containers replace all throwaways as part of conversion to the metric system. In Minnesota, non-returnable carbonated beverage containers should be banned or be subject to mandatory deposit fees.
11. While we see no need to shift the responsibility for refuse collection from municipalities to any higher level of government, far greater attention should be given to holding down collection costs. The costs of refuse collection, in total, dwarf all other components of the solid waste system.
12. In some localities it is not unusual for several refuse haulers to operate on the same block, which can be extremely inefficient. Also, some localities do not have a system which requires complete collection of all solid waste generated within their borders.
13. Moving to a mandatory collection system in which only one hauler operates on a given block need not rule out competition. In fact, while we urge support of the upcoming St. Paul referendum for a mandatory collection ordinance, we believe the city should provide competition both between public and private collectors and among diverse private collectors as well. The city should not negotiate one master contract, whether with its own city crews, a single private hauler, or any single coalition of private haulers.

CURRENT SOLID WASTE PRACTICES AND DEVELOPMENTS

- I. The present solid waste management practices in this metropolitan area pose few compelling health, environmental or economic problems requiring immediate action. This is not to say there is satisfaction with the level at which we consume and discard materials, nor that this area is free of inadequately collected and improperly disposed of garbage. Rather, we have learned that this region does share these problems with other American communities. However, significant progress has been made, and current practices appear to be serving the community reasonably well.

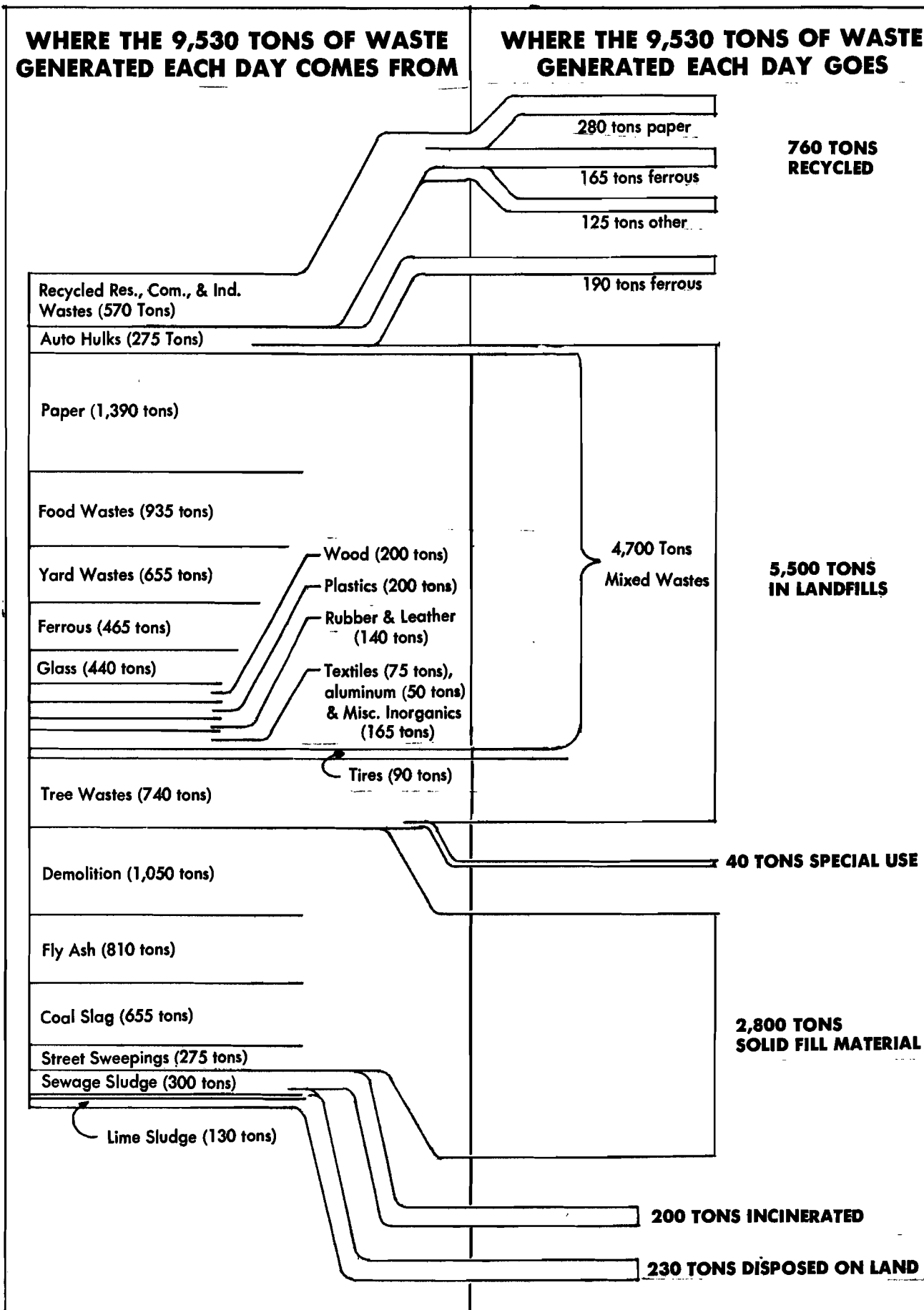
- A. We now have a solid waste system. Our solid waste system can be thought of as a flow of materials from consumers who use and discard materials, to refuse haulers who collect the garbage and transport it either to a transfer station or directly to a sanitary landfill to be buried. The function of the transfer station is to place refuse in a large over-the-road vehicle for more economical transportation to a distant landfill.

Our solid waste system functions fairly well in this metropolitan area. Each day an average of about 5,000 tons of mixed solid wastes move through this system in an orderly, uninterrupted manner. This includes approximately 1,390 tons of paper (30%), 935 tons of food wastes (18%), 655 tons of yard wastes (14%), 465 tons of iron or other ferrous metals (10%), 440 tons of glass (9%), 200 tons of wood (4%), 200 tons of plastic (4%), 140 tons of rubber and leather (3%), 75 tons of textiles (1½%), 50 tons of aluminum (1%), and 165 tons of miscellaneous inorganics (4%). Of this there is 2.24 pounds per capita residential refuse, 1.11 pounds commercial, and 1.18 pounds per capita mixed industrial refuse. (See flow chart on pages 6 and 7.)

1. Much scrap never enters the solid waste stream. The scrap or salvage business in the Twin Cities plays an important part in diverting materials from the solid waste stream. Data collected for the Metropolitan Council during 1974 show that an average of approximately 600 tons of waste per day were being diverted from the solid waste stream and processed through secondary material markets. This included about 280 tons, or 17%, of the waste paper; 165 tons, or 26%, of the ferrous scrap; 15 tons, or 24%, of the non-ferrous metals; and 110 tons of other organics. In addition, 190 tons were recovered from auto hulks.

The two primary sources of scrap consist of the cutoff and waste from our industrial complex and the scrap generated from the disposal of obsolete, worn-out products discarded by people. Paper drives by community groups and the redemption of cans and bottles by recycling centers have brought greater household awareness of the salvage function.

SOLID WASTE FLOW CHART FOR 7-COUNTY AREA, 1974*



*Developed from data prepared by consultants for Metropolitan Council

During periods of high market demand, materials are increasingly diverted from the solid waste stream. For example, in February, 1974, the price for waste corrugated paper rose to \$70 per ton, and nearly all corrugated paper disappeared from the solid waste stream. This was caused in part by the generators, who simply held their corrugated paper back so they could sell it directly themselves, and partly by the refuse collectors, who would set the corrugated material aside for a separate collection.

2. There currently is a great deal of diversity in collection practices throughout the metropolitan area. The process of collecting solid waste is currently the largest and most costly portion of solid waste processing. Refuse collection in this metropolitan area has been characterized generally as being a competitive market with a significant number of small operators. The monthly cost of weekly collections for a single-family home runs from \$2.20 to \$5.00, although most charges appear to be in the \$3.50 to \$4.00 range. This, we have learned, is very reasonable by national norms. Generally, these figures cover a regular weekly pickup and disposal of refuse from up to two 20-gallon barrels, plus some additional yard and bulky wastes. Within these volume limits there is no incentive for a given household to keep down either the weight or volume of rubbish generated.

- * Minneapolis has a mandatory system of residential collection using public and private haulers. In 1970, a group of 49 private haulers formed an organization called Minneapolis Refuse, Inc., and entered into a contract with the City of Minneapolis to provide residential collection for a portion of the city. It was at this time that a no-burning ban had gone into effect, and residential refuse collection became mandatory.

The Minneapolis system is designed to provide an element of competition between municipal crews and private haulers through Minneapolis Refuse, Inc. The city is divided into zones with a deliberate geographical inter-mix between those served by the city and the private haulers. Under this arrangement, approximately 40% of the city is served by municipal crews and the balance by M.R.I.

This system assures the private haulers of compact, well-organized collection routes. Since it is paid for by property taxes, there is no collection problem. This is a particular advantage in the inner city neighborhoods, which private haulers had been reluctant to serve due to experiences with poor collection rates. The private haulers in Minneapolis are paid \$2.88 per household per month for each curbside or alley pickup, and \$3.63 where a carry-out from the yard is required. The city additionally pays a transportation and disposal cost, which comes to 61¢, and incurs a 9.4¢ administrative cost. This brings the total cost to \$3.58 for curb or alley service, and \$4.33 for carry-out service.

- * In St. Paul, city crews compete with private haulers on a house-by-house basis. With the advent of the backyard burning ban in 1971, the city went from a separate system of garbage and refuse pickup to a combined system. Today the city is in direct competition with private haulers, and services about 23% of the city's 70,000 residential units. The city charges its customers \$1.10 per weekly pickup, or approximately \$4.77

per month, except for certain subsidized households which are charged a lower rate of 45¢ a week based on need. Private haulers in St. Paul serving the remaining 77% of the residential units generally charge in the \$3.50 to \$4.00 per month range.

- * The Cities of Hopkins and Farmington currently provide a municipally operated collection service for all their residents. Hopkins funds both a municipal collection system and the operation of its own sanitary landfill out of general tax revenues, and it does not have a cost figure on a per-household basis. In Farmington, individual households are assessed for a city collection service at the rate of \$3.17 per month.
 - * Suburban communities contracting with private haulers for municipal collection appear to have a low-cost system. A number of municipalities in the metropolitan area have municipal contracts for refuse collection. The cost of this service runs from a low of \$2.20 per household per month in Robbinsdale, to a high of \$4.16 in Edina-Morningside where refuse containers must be kept in an enclosed area. Other communities with this arrangement include Anoka at \$3.25 per month, Blaine at \$3.33 per month, Columbia Heights at \$3.10 per month, Deephaven at \$2.50 per month, Excelsior at \$2.92 per month, St. Louis Park at \$3.50 per month, Shakopee (with collection twice a week) at \$2.85 per month, Stillwater at \$3.20 per month, and White Bear Lake at \$3.40 per month.
 - * Most suburban communities leave residential collection arrangements up to private households. A sample telephone survey conducted by the League staff found that current charges for curbside or alley collection range from \$3.00 to \$4.50 per month, and carry-out service ranged from \$3.50 to \$4.75 per month.
3. Uncollected or improperly disposed-of refuse may be a serious problem. While the committee has not received systematic data on the extent of the problem, we have been told that uncollected or inadequately collected garbage may be a problem in those areas not covered by mandatory collection provisions. These same areas also pose a problem, in that private households may turn to illegal, and/or environmentally damaging, means of disposal.
- * Representatives from St. Paul noted that inadequate refuse collection at some households in that community has the effect of harboring rats and encouraging dogs to run in packs. Councilman Hozza noted that the city of St. Paul has received estimates that anywhere from 7,500 to 20,000 of the 110,000 households in the city do not have any organized refuse collection. It was pointed out that there is a direct relationship between those areas where there is an inadequate refuse collection, and those areas in which the city has received its greatest number of complaints about rodents.

A number of undesirable means of disposal were cited as a consequence of St. Paul's voluntary collection system. The committee was told of bags of trash being thrown along the roadsides, the use of the city's litter baskets for disposal of household refuse, and even the use of Goodwill and other private charitable organizations' drop boxes as a place for disposing household refuse.

- * Lack of mandatory commercial collection in Minneapolis has also been reported as an environmental problem. Refuse haulers noted that some businessmen have been reluctant to pay the price of an adequate pickup service in terms of volume or frequency of collection. Rather than lose an account, some haulers are willing to provide an inadequate level of service based on what the businessman is willing to pay.
 - * The degree to which refuse is inadequately collected or disposed-of in suburban communities where collection arrangements are made privately is less clear. It may vary over time by household, neighborhood and municipality. . .depending on the local enforcement and community standards.
4. Garbage trucks which are inadequately designed to meet state axle weight regulations and local ordinances pose problems for local refuse collectors. Haulers appearing before our committee cited state axle weight regulations and conflicting local ordinances as problems they face in collecting the region's refuse.

Rear-loader compacter garbage trucks currently in use or available for purchase have a problem meeting state or local vehicle axle weight limits. Many such trucks have only a single rear axle and are therefore limited to 18,000 pounds on that axle. Since the compacter trucks fill up at the rear end first, they often are overweight before they are half-filled. It was noted that during certain portions of the year, refuse compacter vehicles are drastically overweight because of the composition of the refuse.

The Legislature in 1971 and 1973 gave refuse haulers a two-year variance allowing axle weights to go to 22,000 pounds on roads designated by the affected counties. This expired July 1, 1975, bringing refuse haulers back under the 18,000-pound general axle weight regulation.

Part of the problem with the weight of refuse vehicles is the 6,000-8,000 pounds of equipment on a rear-loading compacter truck, which is almost all behind the rear axle. This particular vehicle design is preferred by haulers because of its flexibility in use and substantially lower price.

5. Refuse collection is a labor-intensive industry. The cost of new refuse collection vehicles ranges from about \$20,000 for a rear-loader compacter truck to a \$45,000-\$50,000 range for front-loading and side-loading equipment. Assuming a six-year depreciation schedule, 10% interest, a 40-hour week, and labor costs of \$7 per hour, the capital cost of a refuse vehicle would run from about 8% of the labor cost on a \$20,000 truck using a three-man crew, up to 60% for a one-man crew on a \$50,000 compacter truck. As such, several private haulers indicated they have found one-man trucks to be the most economical. However, it was noted that most municipal collection services utilize two or three-man crews.

6. Transportation of solid waste is an increasingly important cost factor. Currently, most solid waste is transported directly from a collection route to a sanitary landfill. The cost of disposal to a refuse collector then varies in part by the miles he has to travel to reach a landfill, and the disposal charges assessed at the landfill. Often the labor and equipment cost of getting the material to the landfill exceeds the charge of the landfill operator.

In Minneapolis the charge for disposal at the city's two transfer stations is \$7.32 per ton. This compares with an average disposal charge of \$2.50 per ton at sanitary landfills. Commercial haulers in Minneapolis told the committee that they find it economical to use the transfer station when they can save 20 miles or more on a trip one way. Put another way, the cost of disposing of the average family's refuse from Minneapolis for one month delivered at a transfer station is 61¢. The same family's refuse delivered at a landfill charging \$2.50 per ton would cost 21¢ for disposal.

7. The ultimate disposal of solid waste collected in the metropolitan area is at one of 14 sanitary landfills, 8 special-use landfills, 2 leaf-composting centers, or 2 hazardous-waste incinerators. Mixed refuse all goes to the sanitary landfills.

A sanitary landfill provides a regulated method of dumping wastes on land, compacting and covering them with soil at the end of each day in accordance with a preconceived plan for the reuse of the landfill site. By definition, sanitary landfills are designed and operated in a manner to prevent health hazards and nuisances such as water pollution, odor, blowing paper, and unsightliness.

Landfills in the metropolitan area are subject to the regulations of the Minnesota Pollution Control Agency, the Metropolitan Council, and the individual county in which the landfill is located.

There currently is an adequate total landfill capacity available at existing landfills within the metropolitan area for some time to come.

In compliance with legislation enacted in 1969, the Metropolitan Council adopted a solid waste management development guide in 1970 which called for the use of sanitary landfills as the primary mechanism for solid waste disposal for a 10-year period. Since that time, sanitary landfills have been established with licensed capacity to serve the area to 1980. However, most landfill operators own adjoining land, and there are no physical space constraints to expanding these present landfills both horizontally and vertically. *In other words, the licensed capacity would be expanded significantly simply by changing the provisions of the licenses.*

8. Approximately 75% of the hazardous waste generated in the region is disposed of in an unknown, unregulated, and probably illegal manner. This finding came in a consultant's report developed for the metropolitan counties. The study identified 70,500 tons of hazardous waste which is generated each year, of which 32,500 tons come from oil wastes.

Of the two hazardous waste incinerators operating within the metropolitan area, one is maintained by the 3M Company for its own internal use. The one general-use facility is operated by Pollution Controls, Inc., near the Minnesota River in Scott County. Landfill operators are required to segregate any hazardous wastes brought to them for transfer to the incinerator and disposal. We were told that much of the hazardous waste may be illegally disposed of through the sewer system.

Representatives from the Metropolitan Inter-County Council noted that the non-oil type of hazardous wastes may be the most serious. Of those not disposed of through sanitary sewer systems, 5% are incinerated, 10% are landfilled, 25% are recycled, and 60% are privately hauled with the destinations unknown.

The hazardous waste problem in this metropolitan area is new only in that it is now more fully recognized, and it may be less serious here than in other metropolitan communities of similar size, but with greater concentrations of processing industries. Biological contaminants from hospitals and other health care facilities were cited as potentially a serious problem requiring careful monitoring and special treatment.

- B. Nearly all aspects of the region's solid waste management system have changed dramatically since 1969. The advent of backyard burning bans moved most Twin City households from a segregated system of garbage or food wastes kept in a closed container and other refuse which was incinerated often in a 50-gallon barrel, to a combined collection system using only closed containers.
1. The replacement of open burning dumps with fewer, more distant sanitary landfills and a dramatic increase in the volume and weight of refuse to be collected with backyard burning bans, necessitated substantially greater movement of refuse. Responding to these changes, the refuse industry moved almost exclusively to compacter trucks with their increased volume and better-managed loads.
 2. Legislation enacted in 1969 delegated responsibilities for managing solid waste disposal in the metropolitan area among the Minnesota Pollution Control Agency, the Metropolitan Council, and the seven metropolitan counties. The regulation of the collection system remained basically a responsibility of the local municipality. The MPCA was given responsibility for promulgating and enforcing state standards regulating the setting, operation and monitoring of the solid waste treatment and disposal facilities. The Metropolitan Council was directed to prepare a comprehensive plan for the disposal of solid waste. The metropolitan counties were given the responsibility for implementing a solid waste program in compliance with the Metropolitan Council's comprehensive plan. Each county was directed to prepare and submit to the Council for its approval its own comprehensive plan.

The counties were authorized to operate and maintain their own solid waste disposal sites and facilities, and to adopt ordinances governing the operation of solid waste haulers, disposal sites or facilities in the county maintained by any local unit of government or person. The counties were made responsible for ensuring that non-conforming solid waste disposal sites and facilities were terminated and abandoned, and for monitoring authorized sites and facilities.

With the exception of Washington County, the metropolitan counties opted to leave the operation of sanitary landfills to licensed private operators or local units of government. Until it was closed in late May, Washington County maintained its own sanitary landfill; the City of Hopkins currently maintains a landfill for its own collection crews; and the City of Anoka owns a sanitary landfill but contracts out its operation to a private party.

3. The Minnesota Pollution Control Agency and private environmental groups in Minnesota have been energetic in their efforts to protect the environment from solid waste problems. On receipt of a grant from the federal government in 1968, the Pollution Control Agency began planning a solid waste management system. Formal responsibilities were assigned with the 1969 legislation, and since that time the Solid Waste Division of the MPCA has adopted standards for the collection, transportation and disposal of solid wastes. The agency works for the prevention and abatement of water, air and land pollution from solid waste.

* Rochester landfill dispute illustrates environmental concern with solid waste management. In 1970, a citizens group from a township outside of Rochester petitioned the county board to prevent the city of Rochester from building a sanitary landfill within the township. . .one which the residents felt would be environmentally harmful. Their petition was denied, and the matter was then litigated in the courts with considerable participation by the MPCA and private environmentalists. In 1972 the landfill first went into operation. Upon request from the MPCA the Environmental Protection Agency reviewed the landfill site and recommended a liner be provided to contain leachate, which is a liquid formed when water percolating through solid waste flushes out compounds and other products of refuse decomposition.

In 1973, the MPCA amended the Rochester landfill permit to require the installation of the recommended liner, and the insertion of equipment to vent methane gas as it is produced in all additional portions of the landfill. In January of 1974 the MPCA held a ten-day hearing on the Rochester landfill and has since voted to deny a request that would have forced the closing of the landfill. At this point there has been some leachate generation at the point of the liners, but the MPCA's monitoring of groundwater around the landfill does not show any problems to date.

4. In 1971 the Minnesota Legislature passed innovative legislation to stimulate recycling of auto hulks. The bill streamlined legal procedures for the handling of abandoned auto vehicles, set up a reimbursement program for the collection of costs incurred by governmental units in cleaning up abandoned vehicles, allowed for the establishment of collection sites for retired and abandoned vehicles, and provided reimbursement to governmental units for the cost of collecting inventories of abandoned vehicles. \$800,000/year in funding for the program was provided in 1972-75 from a \$1 tax on the transfer of title of every vehicle weighing over 1,000 pounds.

Once an inventory of abandoned vehicles is developed, the individual county then advertises for bids from auto salvage firms. The low bid may either call for a modest disposal charge paid by the state or actually pay the state for the auto hulks when the price of scrap is up.

Under the program, 78 of the state's 87 counties have conducted an inventory of their abandoned vehicles, and 50 counties have contracted for the collection and recycling of these vehicles under the MPCA program. In its first three

years of operation the program has resulted in the direct removal of nearly 75,000 vehicles, and it is estimated that the contractors have removed up to half as many more through private arrangements while the salvage programs were operating within a given county. In addition to the program, approximately 200,000 abandoned and retired vehicles per year are routinely collected from salvage and impoundment lots and recycled by private industry without the need of state subsidy.

The program has the advantage of applying a minimum amount of subsidy, and only where and to the amount needed. Scrap prices for flattened motor vehicles increased from \$7-10/ton at the program's start in July, 1972, to \$35 to \$40/ton in April of 1974. . .dramatically reducing the need for any subsidy.

5. A hazardous-waste monitoring system has been designed through a study done for the Minnesota Pollution Control Agency and the Metropolitan Inter-County Council. In 1972, the two agencies received a federal grant to conduct a study to determine the nature of the hazardous waste problem, develop a working definition of hazardous wastes, and develop an administrative control system for hazardous wastes. Under the new system developed, a generator of the waste must run materials through a decision model. If the waste is found to be hazardous, the firm must be licensed as a generator of hazardous waste, and the materials will then be processed through a regulated, licensed disposal system. This hazardous waste monitoring system is reported to be the most comprehensive of any system developed for a unit of general government in the United States today.
 6. Minnesota developed pioneering package review legislation. Minnesota legislation was enacted in 1973 which directs the MPCA to review new and revised packages or containers sold at retail in Minnesota to determine whether the packages or containers will constitute a solid waste disposal problem or be inconsistent with environmental policies of the state. If the agency determines that a particular package or container constitutes an environmental problem, it may, after a public hearing, issue an order prohibiting the sale of the package or container in the state. This prohibition would last until revoked by the agency, or until the last day of the following legislative session, whichever comes first, unless extended by law.
- * In accordance with the 1973 legislation, the MPCA has developed and approved regulations and guidelines that identify those types of new or revised packages that are subject to a review. Any person may submit a sample package to the agency for review.

The state's regulations provide that in reviewing a new or revised package the MPCA will assess them relative to whether they: 1) minimize the potential for environmental contamination, including but not limited to the release of metal or substances with the potential for biological harm; 2) minimize the total energy cost; 3) minimize the use of scarce or non-renewable resources; 4) minimize the use of virgin materials; 5) are most recyclable where recyclability is consistent with 1 and 2 above; and 6) minimize adverse economic effects on the consumer, the labor force, and industry, consistent with 1 and 2 above.

The state regulations do not apply to any package or container sold in retail in this state prior to May 25, 1973. The state regulations also limit the review to packaging for food and beverage, household cleaning supplies, and

cosmetics and toiletries. These three categories consist of approximately 85% of the residential packaging solid waste. The regulations for package review are applicable to 75% of the paper, 99% of the glass, 85% of the steel, 95% of the aluminum, and 57% of the plastics in residential packaging solid waste.

- * Packaging review provisions function as an early warning system. The MPCA can not keep a package indefinitely off the market in Minnesota. It can only alert the Legislature to potential problems, and delay marketing of the product until the Legislature has time to consider banning the product through direct legislative action.

The Metropolitan Council has conducted a major study on the need for a coordinated approach to resource recovery. In 1974 the Minnesota Legislature required the Metropolitan Council to undertake a study and report back to the Legislature in 1975 with its recommendations for solid waste recycling facilities in the metropolitan area.

- * The Metropolitan Council's solid waste management study calls for efforts to reduce the amounts and the types of materials entering the solid waste stream as well as reusing and recycling material and energy from solid waste. Because this source reduction and resource recovery have the mutual goal of materials and energy conservation, both of these concepts should be encouraged.
- * The Metropolitan Council study is somewhat skeptical of the long-term economic viability of resource recovery projects for this region. It concludes that even under a 20-year amortization period and public bonding of capital costs, net annual losses for various alternative methods of recycling 2 million tons of mixed solid waste would range from \$7 million to \$19 million as compared to existing disposal practices. These losses must be made up through increased disposal costs and/or additional governmental and financial involvement. However, the report does note that the economics of recycling will improve as prices for secondary materials increase and as recycling technology becomes more fully developed.
- * The Metropolitan Council study recommends the extension of solid waste planning and regulatory responsibilities of the Minnesota Pollution Control Agency and the Metropolitan Council to cover resource recovery facilities processing materials from the solid waste stream.
- * The Council's report asks for authority to establish resource districts to be exercised only after public discussion at which governmental units, waste collectors, and resource recovery providers determine that districting is necessary to assure the viability of resource recovery facilities. The report also recommends that the metropolitan counties and the Metropolitan Waste Control Commission be extended authority for the acquisition of resource recovery sites and facilities.
- * Many of the recommendations in the Council's report have been incorporated in legislation developed as a committee bill by the Senate Metropolitan and Urban Affairs Committee. This legislation has passed the Minnesota Senate and awaits hearing by the House Local and Urban Affairs Committee.

8. Metropolitan area residents have given good response to recycling programs. Testimony from the president of the Metropolitan Recycling Center indicated that residents of the Twin Cities metropolitan area have shown enthusiasm and support for recycling programs. In fact, he noted, they are almost overwhelmed with organizations and groups seeking to get involved with recycling through specific projects or activities. As the markets allow, groups in the metropolitan area have been active in separating newspapers, cans and bottles for recycling. Volunteer enthusiasm has, of course, been somewhat deterred by the recent collapse of the market for waste paper, and the general inability of some groups to achieve the profits they anticipated.
9. Debate over beverage container legislation indicates substantial interest in reducing the consumption of materials and generation of solid waste. "Ban the can" legislation to discourage the use of throw-away beverage containers received tremendous public attention during the 1973-74 legislative session, and again in 1975. The 1975 session passed a bill outlawing detachable flip-tab beverage containers after January 1, 1977. Another bill that would require a minimum deposit on all beverage containers was approved by the House of Representatives Environmental Preservation and Natural Resources Committee, and is likely to receive further discussion in the Minnesota Senate in 1976.

II. Fundamental long-term problems should be considered. While our committee received reassuring information on the basic short-term adequacy of current solid waste management practices in this metropolitan area, we were struck by the profound, and negative, consequences to our economy and our environment of continuing these practices indefinitely. We have learned that *both the ability to preserve adequate natural resources to maintain our standard of living, and the ability to preserve the quality of the physical environment in which we live, may be at stake.*

A. A continuation of current material and energy consumption patterns will cause severe problems in the years ahead. The United States and the world is faced with a decreasing supply of virgin, non-renewable materials. As the supply diminishes, competition will force the price up, and exploration and extraction programs are likely to be undertaken that are more costly economically and environmentally damaging.

1. Both petroleum and metals are in short long-range supply. A great deal of attention has recently been given to this country's energy needs in light of the cartel activities of the petroleum exporting countries. It is now well-known and accepted that there is a short-term problem of supply and price manipulation. . . and a long-term problem of diminishing oil reserves. Our committee has come to understand that we are also depleting the available reserves of virgin metals and other materials.

It now appears that the United States is running out of some materials and getting into an increasingly tight position relative to others. More and more of our reserves are being reduced, thus creating a growing dependency on imports. Our committee's attention was called to a Department of Interior study that found that our reliance on foreign sources for metals will increase from \$5 billion in 1970 to an annual level of \$16 billion in 1985, and a staggering \$36 billion by the year 2000. In time, according to some experts, the United States may be in a precarious supply position relative to copper, lead, zinc, aluminum, manganese, nickel, and tin.

2. It is very important to keep materials in their most usable form. For the most part, metals and other materials are not consumed or destroyed through their use. Rather, they are normally put in a less available form and/or place. . . requiring greater processing for reuse. The degree of work or energy required to restore a material to a usable form becomes a critical matter, as the value of scrap or waste material is directly related to its potential value once recovered and to the cost of the recovery.
3. Recent trends have been away from reuse, recycling, and recyclability. Not only is there a continued trend toward the greater use of disposable products, we are less likely to reprocess or recycle materials once they have served their designed function. Since 1945, the paper industry has tended towards a declining rate of recycling and increased use of forest-derived resources. This same trend can be seen with aluminum and other raw materials. A significant element in this is the trend towards products with a more sophisticated application of materials, and a lower salvage value. For example, bi-metal cans and disposable paper products have lower recovery value than a more pure use of the ingredients.
4. Present refuse collection and disposal procedures eliminate some forms of resource recovery. Mixing all residential refuse and most commercial refuse together in large collection vehicles, and then burying the load at a sanitary landfill, has eliminated one form of resource recovery. Despite their other problems, burning dumps did facilitate the salvage of scrap and the direct continued use of some discarded materials.

Salvage dealers noted to our committee that the proper segregation of scrap is an important element of the economics of their industry. The key, they reported, is to get the right product to the right user. This can best be accomplished when the scrap is segregated at its source, and then knowing the grade of the scrap as it is passed on from the generator to the salvage dealer. Properly segregated and graded scrap can then be sold to the user, who can make the highest economic use of that particular grade.

5. Ways must be found to reduce both the consumption of materials and energy, and to economically recover materials for their reuse. The committee has come to understand there are many serious practical limitations to reducing the consumption of materials and to their recovery for reuse. Both of these procedures will help, but neither is likely to adequately protect our resource supply.

B. The long-term environmental and economic costs of continued reliance on sanitary landfills is uncertain. While it is generally accepted that the transfer from burning dumps to sanitary landfills represents significant environmental improvement, there is growing concern that landfills may in time prove to be quite harmful to the environment.

1. Over time, water percolating or leaching through the landfills may pick up harmful materials from the decaying refuse and cause serious groundwater pollution and/or water treatment expense. Aside from the relatively small channeling effects, this leachate is not produced until the refuse becomes saturated with water. At this point, any further water entering the waste will cause an equal volume of leachate to leave the waste.

No one knows for certain how serious an effect the discharge of leachate from a well-managed sanitary landfill is likely to have, since there is only a short history of sanitary landfills and there is disagreement among experts. We have learned that the potential harm from landfill leachate depends on such factors

as the amount and composition of the leachate generated; soil filtration occurring before the leachate reaches the groundwater; the quality, quantity and movement of the groundwater; what happens to the groundwater before it is used; and what use is made of the groundwater.

- * The character of leachate generated will depend on the amount of time allowed for organic decomposition before it is produced, and the presence of other harmful materials in the refuse. The time required for leachate to form varies widely, depending on the amount of precipitation in the given area, whether the precipitation is evenly distributed or occurs in a short period of time, the type and amount of soil cover over the refuse, and the slope and vegetation of the soil cover.

Most sanitary landfills are designed and operated in accordance with regulations designed to minimize the production of leachate until the organic decomposition of the refuse is largely completed and to be free of hazardous materials. However, some authorities question whether it might not be preferable to locate landfills along waterways where any polluted water will be diluted and treated by running water. For this reason, local landfills along the Minnesota River may, or may not, be a particular problem.

- * As a safeguard against groundwater pollution, all sanitary landfills in the state are required to have a system to monitor for early signs of leachate production. Generally, this monitoring system consists of a series of shallow wells drilled into the groundwater and placed at strategic locations around the landfill. Periodic samples are taken from the monitoring wells, and the results of a laboratory analysis of these samples are reviewed by the Pollution Control Agency staff.
 - * Authorities indicate that, in time, all landfills will become saturated with water and begin to produce leachate. Depending on the many environmental factors involved, adequate natural treatment of the leachate through soil attenuation (purification) processes may occur, or a costly system of collecting and treating the leachate may be required.
2. Once landfills are filled to capacity, they have a very limited reuse. As part of the organic decomposition process at a sanitary landfill, methane is produced. Methane is a colorless, odorless gas that is highly explosive in concentrations of 5% to 15% when in the presence of oxygen. If the soil cover of a sanitary landfill is relatively impermeable, the methane will be prevented from rising and venting vertically into the atmosphere. It will then move laterally through the subsoil until it reaches a permeable area where the gas may vent vertically. This lateral movement of methane may result in accumulations of explosive concentrations. If a building, or other barrier, is placed between refuse and the atmosphere, explosive concentrations are also likely to occur. For this reason, *former landfill sites are basically unsuited for development and are best left for park, open space, or agricultural uses.*
 3. Any new landfills are likely to be unpopular, more costly to acquire and maintain, and necessitate additional transportation costs due to more distant locations. While this metropolitan area currently has adequate landfill capacity at present generation rates for some time to come, a continued reliance on landfills for a large volume of solid waste will eventually lead to more costly and distant landfills. The availability of reasonably close-in and accessible future landfill sites is limited by physical, environmental and political considerations. While landfill disposal costs here currently average about \$2.50 per ton, costs that are eight times that high are not uncommon on the east coast. . .when reasonably accessible, environmentally approved landfills are available.

III. Major new developments now in process or under consideration could shape solid waste processing procedures for many years. The pattern of significant change in the management of solid waste in this metropolitan area over the last few years appears to be continuing. . . perhaps at an accelerated rate. Changing market economics, proposed new regulations, and major new resource recovery facilities may change the quantity, composition and processing of solid waste in the years ahead.

- A. The most significant, long-lasting developments are most likely to be those stemming from basic changes occurring in the marketplace. Changes in the availability and price of materials and energy are likely to strongly influence product designs, affect consumer demands, and perhaps stimulate secondary or scrap material markets. This, in turn, is likely to have a profound long-term effect on the generation of waste, its entry or diversion from the solid waste stream, the composition of waste, and how it is processed.
- B. Actions to reduce waste generation could change the volume and composition of solid waste. Persons appearing before our committee noted that refuse in this country reflects much different consumption and disposal patterns than are found in the rest of the world. Data prepared for the Metropolitan Council show a local per capita generation rate of 4.3 pounds per day, and an estimated 5.8 pounds per day projecting current trends to 1990. This compares with current European refuse generation of less than 2 pounds per person per day. In addition to having a lower volume, European refuse differs in that it has a higher percentage of foodstuffs and plastics, and a lower percentage of paper.

This difference in waste generation undoubtedly reflects a wide range of factors including life styles, culture, tradition, labor and material costs, business organization and competition, and others. Clearly, marketplace economics in this country encourage the most cost-effective trade-offs between labor and material expenses in the production and marketing of consumer goods. Packaging is carefully designed to protect a product, facilitate its economical distribution, advertise and promote the product, and provide consumer convenience and service. . . all at the lowest material and labor cost.

Any major adjustments in the use of materials or consumption patterns would affect what is discarded in the solid waste stream. Therefore, whether we continue current trends of general increased consumption, stabilize or reduce general consumption, or see a selective increase or decrease in the use of virgin materials, is likely to have a major effect on the solid waste stream and its processing.

1. Minnesota packaging review may have major long-term effects. The Minnesota regulations do not cover packages or containers now in use in the state. Rather, they provide public interest criteria to be used by industry in developing packaging for products to be sold in the state and for the MPCA in evaluating new or revised containers. This means that, over time, we may avoid the development and marketing of some packaging practices which run counter to the public interest.

* Packaging is one of the fastest-growing components of the solid waste stream. Data generated by the Environmental Protection Agency show that between 1958 and 1971 packaging material consumption increased by 51% per capita. In 1971, packaging accounted for approximately 47% of all paper production, 14% of all aluminum production, 75% of glass production, 8% of steel production, and 29% of plastic production.

- * The packaging review regulations could reduce the growth in packaging materials. Since the packaging criteria established by the MPCA emphasizes the conservation of materials, they may prove significant in preventing wasteful new procedures. For example, in talking with our committee, a representative of a local food chain noted that if the packaging program had been initiated years ago, there are a number of items they handle - such as one-way beverage containers - which he feels would have been prevented. To date, no packages have been prohibited, although some may have been designed differently or held off the market in Minnesota.
- 2. Restrictions on beverage containers would affect solid waste stream. In 1972, beverage packaging represented approximately 20% of all packaging wastes, and 7% of the municipal solid waste. This segment of the solid waste stream has been growing at a rate of 8% a year. Accordingly, legislation which would strongly encourage or require the use of returnable containers would be significant.
- 3. Incentives for the extension of product lifetimes, the reuse of non-beverage containers, the repair of consumer products, and the marketing of used goods, are other material conservation and waste control approaches which could be important. In one sense, these approaches do not represent a new practice. . .but rather a return to procedures that were more commonplace in this country a few years back, as they still are to a greater degree in other industrialized western nations.
 - * The extension of product lifetimes could be particularly significant. One can plainly see the major savings that could be accomplished if the lifetime of a given appliance were extended from 10 to 15 years. A major switch in consumer demand towards goods with greater durability and repairability could have this effect.
 - * The emphasis on maintenance and repair of consumer products is a proven means of significantly reducing post-consumer waste. One of our resource persons noted that during a recent trip abroad he had observed continued maintenance and use of vehicles and other materials that had been left by the United States military at the end of World War II. Most products, it was suggested, may have a useful life considerably longer than most of us are willing to provide repair and maintenance for.
 - * Milk bottles, egg cartons, grocery bags, and vinegar jugs were cited to our committee as examples of containers that could be reused at a savings to customers and to the environment. However, we learned that when Red Owl experimented with a returnable container program, they discovered it would not be well used without a major promotional effort.
 - * The marketing of used products is another conservation measure that works. Garage sales, second hand store merchandising, and the distribution of used materials by charitable organizations, are examples of a recycling system that clearly functions to put discarded materials to their highest economic use.
- 4. Higher prices for secondary materials would encourage the private salvage of materials before they can enter the solid waste stream. We presently recycle only a fraction of the scrap or waste materials available for reclamation. A recent study by the Battelle Institute

for the National Association of Recycling Industries indicates we recycle 19% of the paper available, 26% of the steel, 61% of the copper, 48% of the aluminum, 17% of the textiles, 42% of the lead, 88% of the stainless steel, 14% of the zinc, 40% of the nickel, and 75% of the precious metals.

The reason why the rate of recycling is low for many of these commodities is that additional collection and processing is too costly to be economically feasible at current market prices. Accordingly, improved markets for these materials would assure a higher rate of recovery.

5. Discriminatory tax rates, freight rates, and government procurement policies have been cited as artificially reducing the use of recyclable materials. A local scrap dealer noted to our committee that the freight rates on ferrous scrap are approximately 2½ times higher than iron ore rates. A representative of Hoerner-Waldorf explained that freight rates are the same for paper scrap and pulp although some of their people at the recycling end maintain that scrap should have a lower rate due to its lower market value. On the other hand, their people working with virgin pulp maintain that both materials receive equally fair treatment.

- * EPA study indicates that current rail freight rates for scrap iron, glass cullet, and recycled rubber are high relative to competing virgin materials, and that ocean freight rates are relatively high for waste paper. This may be significant for these secondary materials as the freight rate is a substantial fraction of their overall delivered cost. A significant adjustment of freight rates could cause a significant price change and, if the demand is elastic, a corresponding change in consumption.

A "burden" study by the U. S. Department of Transportation shows a revenue-to-cost ratio for railroads for iron and steel scrap of 1.42 as compared to a ratio of 1.30 for iron ore. . . .8½% less. On the other hand, the revenue-to-cost ratios for wood pulp and waste paper are 1.50 and 1.15, with waste paper having the advantage.

- * Favorable tax treatment for virgin materials may give them a significant advantage over secondary or scrap materials. Areas often cited as providing favorable tax treatment include a tax deduction based on the depreciation of a material deposit, allowing material-extraction industries to deduct from current income the exploration and development costs they incur before a mine reaches the production stage, allowing firms operating outside the United States to deduct foreign tax credits directly from their U. S. tax liability, and others other benefits for specific industries.

An EPA study shows that the combined tax benefit for timber shows an average combined benefit of 90¢ per ton of paper; the average combined tax benefit for bauxite used for aluminum production is \$1.50 per ton; and the average tax advantage for sand used in making glass is 8.2¢ per ton.

- * Increased utilization of secondary materials could be stimulated through governmental procurement policies. It was called to our committee's attention that governmental procurement policies have often been discriminatory in requiring the use of virgin materials when technically equivalent secondary materials were available at a lower price. While governmental purchases represent a small portion of the total potential market for products made from our scrap materials, a more even treatment of secondary materials and government procurement procedures could help stimulate increased recycling.

C. Major resource recovery facilities and systems of long-term significance are under consideration by a wide range of public and private groups. Resource recovery can be thought of as the salvage of materials and/or energy from refuse after it has been discarded and placed in the solid waste stream. This can be differentiated from the more general concept of recycling or reusing materials which may or may not have entered the solid waste stream.

1. Currently, resource recovery has caught the imagination of environmentalists, planners, engineers, and investors nationally, and in this metropolitan area in particular. Major attention and planning for resource recovery in this region has been given by the Minnesota Senate, the Minnesota Pollution Control Agency, the Metropolitan Council, the Metropolitan Waste Control Commission (formerly the Sewer Board), the metropolitan counties through the Metropolitan Inter-County Council, Hennepin County, the University of Minnesota, the Cities of Minneapolis and St. Paul, local electric and gas utilities, the company operating the Minneapolis transfer station and the Pine Bend landfill in conjunction with a large local paper container manufacturing firm, the Metropolitan Recycling Center, and additional private parties with a profit motive interest in exploring resource recovery.

While in the Twin Cities to meet with our committee, Eugene Pollock, the editor of the Solid Waste Management magazine, noted that he has observed more resource recovery planning and discussion here than anywhere else in the country. This is despite the fact that this area has much less compelling economic and environmental problems with the operation of our solid waste system than is generally found in urban areas throughout the country.

2. Five different parties are currently studying resource recovery facilities designed to use St. Paul refuse. Currently, within the city of St. Paul there are daily about 900 tons of mixed residential, commercial and industrial refuse generated which could be processed at a resource recovery facility. With the generation of additional yard waste in the spring and fall, the daily generation appears to increase to about 1,100 tons, and drops to about 600 tons each day during the heart of winter. The projects under consideration could use a total of over 4,000 tons per day.

A Metropolitan Waste Control Commission resource recovery facility proposed for their Pig's Eye plant would be designed to use 700 tons of refuse during the periods of maximum refuse generation to assure a supply of 360 tons per day needed during periods of light generation.

Facilities being explored to provide steam for the Hoerner Waldorf paper container manufacturing facility in the St. Paul midway call for the use of between 1,200 tons of refuse per day based on current usages and 2,000 tons to accommodate projected increases in the demand for steam at Hoerner Waldorf.

Peak steam loads for the industrial complex of Whirlpool, 3M and Hamm's on the east side of St. Paul could utilize approximately 1,000 tons of refuse per day. Peak loads for heating buildings in the St. Paul central business district could use an additional 750 tons per day.

If the planned facility for the Pig's Eye plant, Hoerner Waldorf, the east side St. Paul industrial complex and the St. Paul central business district were all completed, over 4,000 tons of refuse per day would be required to meet the demands during the coldest part of the winter. *This appears to exceed the total generation of process-able waste throughout the seven-county metropolitan area during that part of the year.*

See Appendix A for descriptions of the planning by the Waste Control Commission, Hennepin County, Phoenix, Inc., the St. Paul Housing and Redevelopment Authority, the Metropolitan Recycling Center, and others.

3. A newsprint-to-newsprint recycling facility at Hoerner Waldorf would greatly expand the reuse of waste paper. Representatives from Hoerner Waldorf indicated to our committee that they felt there was an 80% probability of the company building a new recycling facility at their St. Paul midway site which would de-ink newspapers for the production of recycled newsprint.

Similar facilities are now in operation in New Jersey, California and Illinois. Such a facility has been under consideration by Hoerner Waldorf off and on for several years. We were told that the primary reason Hoerner Waldorf had not pursued such a facility earlier was largely because it was not able to secure adequate commitments to buy the recycled newsprint from newspapers operating in the multi-state area the facility would serve. Since that time the price of newsprint has gone up substantially, and there have been periods when the supply of newsprint was interrupted by strikes.

Hoerner Waldorf is currently using three consultants as part of a feasibility study on the proposed newsprint facility. The first consultant will be looking at the waste paper market and the potential supply of waste newspapers from a several-state area. An engineering consultant is looking at the equipment and technical process they would use. The third consultant is exploring conditions within the newsprint production and newspaper industries as they would affect the long-term markets of recycled newsprint.

Preliminary plans indicate that such a newsprint facility would require recovering at least 50 to 60 tons of newspapers from the metropolitan area each day, or approximately a 50% recovery rate. That would be double the rate of newspaper recovery from the metropolitan area during normal market conditions over the last few years.

IV. Major uncertainties exist as to the potential economic and environmental value of various resource recovery systems for this metropolitan area, at this time.

Throughout our study we encountered widely conflicting views on the practicality of resource recovery programs. For example, the March 31 issue of the Minneapolis Tribune carried the story quoting the city engineer from Fairmont, Minnesota, as indicating: "There are so many aspects of economic and ecological savings in this project (to produce electricity from rubbish) that sometimes it's hard to believe that it can be all that good. . . . We could end up selling power to other communities. Or maybe we could make a deal: You give us garbage; we give you electricity."

On the other hand, some resource people appearing before our committee cited what might best be described as "horror stories" about expensive failures with resource recovery facilities in the United States and Europe. This paradox was illustrated by a consultant on resource recovery to Hennepin County, who expressed optimism about resource recovery feasibility here, but indicated he knew of no resource recovery facilities to date which have proven to be self-supporting.

A. Reports on resource recovery facilities elsewhere are conflicting, unclear, and of limited direct transferability here. Although major facilities which recover metal and energy from solid waste have been in operation in other countries since the early 1950's, there has not been much experience to date with such facilities in this country. This may be important, since we have learned that American refuse tends to have different characteristics than European refuse. Since American refuse is thought to be more abrasive, it may pose some equipment problems, while its greater energy value presents an opportunity.

1. The European experience with incineration and energy recovery has been cited as a model of success and one of failure. For example, we were told of the Swedish community of Solna, which was designed and built around an incinerator in 1968. The plan was to burn refuse to generate steam and electricity needed in the community. The plant was designed to burn 80% refuse and 20% fuel. However, it was explained to us that within 5 years after the plant was completed, the use of refuse had been phased out completely, and the facility was burning 100% fuel oil. Presently, a new power plant is under construction, this time designed exclusively to use oil.

On the other hand, we were told that the Von Roll, Ltd., company of Switzerland currently has 84 resource recovery incinerators it has built in operation and another 32 plants under construction. The firm's first plant -- built at Berne, Switzerland -- has been in continuous operation since 1954, and all of the Von Roll plants built to date remain in operation.

2. Conflicting reports have been received on the experience of St. Louis and Nashville with resource recovery facilities. These two facilities are often cited as the most modern, workable resource recovery facilities currently operating in the United States today.

* The St. Louis project utilizes mixed residential and commercial refuse as a supplemental fuel at Union Electric Company's Merrimac power plant. The City of St. Louis has the operational responsibility for the waste processing facilities, and the Union Electric Company has the operational responsibility for the fuel-firing facility. Incoming refuse is shredded to a 1½-inch particle size. The shredded waste is then separated by an airstream into a light combustible fraction containing about 80% of the incoming waste and a heavy waste fraction consisting of metals, glass, rocks, rubber and heavy plastic. Ferrous metals are then magnetically recovered from the heavy waste fraction.

The light combustible fraction is then trucked 18 miles to the Merrimac plant, where it is injected by air into a suspension-fired boiler at the rate of 15% of the boiler's fuel requirements. The primary boiler fuel is either coal or gas.

In addition to the Merrimac plant, Union Electric has seven other facilities in the immediate vicinity of the St. Louis area. Based on its experience with refuse at the Merrimac plant, it is reported that Union Electric is planning to spend \$70 million to enable them to use solid waste as a supplemental fuel with their other generating plants. On the other hand, one resource person noted that on a recent visit he made to St. Louis he found it is still uncertain as to whether the modifications they have made to reduce friction and correct other problems will be sufficient. The question was also raised as to whether air pollution problems stemming from burning the refuse have been adequately corrected.

* The Nashville project is designed to incinerate municipal refuse to produce steam for heating and cooling government and private office buildings in downtown Nashville. The National Thermal Transfer Corporation was created as a non-profit entity to build and operate the facility. The arrangement calls for the local metropolitan government to furnish the facility with all of the refuse it requires up to the maximum amount generated, and the corporation will incinerate the rubbish without a disposal charge. To insure it would have adequate revenue to cover its bond payments, the corporation has authority to make whatever rate adjustments are necessary over a 30-year period. The principal tenants in this arrangement are the State of Tennessee with 14 office buildings, and the metropolitan government with four buildings.

The Nashville facility incinerated its first load of rubbish in July, 1974. However, it was then shut down in order to add additional air pollution control equipment. As a result of this and other problems, the commission's board has announced that it will have to raise its heating rates 110% and its cooling rates 30% to cover its costs.

3. A private venture in the North Boston area may prove to be the most meaningful resource recovery experiment to date. This privately owned, operated and managed facility will incinerate 1,200 tons of refuse each day to produce steam to power a 1,300-employee General Electric manufacturing plant in a suburban area north of Boston. The project brings together 15 to 18 different towns whose rubbish will be used; the firm of Wheelabrator-Frye, which will build and operate the facility; and General Electric, which will use the steam produced.

Wheelabrator-Frye has a 14-year contract which provides that General Electric will purchase steam at a discount price tied to the price of oil, which GE is now using. As part of the agreement with local communities, Wheelabrator-Frye will accept all refuse from the community; however, a community must pay a minimum refuse disposal fee, regardless of whether the refuse generated might drop below that level. The basic disposal rate charge will be \$13 a ton, which is a drop from \$18 per ton previously charged at an adjacent landfill. The length of the agreements with communities varies, with many running 20 years or more.

4. A flexible disposal charge arrangement has been developed for New Jersey project. Representatives from Wheelabrator-Frye explained to our committee that they entered into a contract with the New Jersey Central Power and Light Company to develop the first 100% garbage-to-electricity plant in the United States. The New Jersey facility is designed to dispose of 4,000 tons of garbage per day and recover 230 tons of metal for recycling. It is intended to operate at a 2,000-4,000 ton per day level and generate nearly a billion kilowatt hours of electricity per year.

Initially, the refuse disposal costs to area residents will be \$9 per ton. This charge will be adjusted upward based on the cost of living for the $\frac{1}{2}$ of the total cost attributed to operating expenses. At the same time it is likely to be adjusted downward based on the cost of energy. Jersey Central agreed to tie the price they pay to the cost they pay for energy at their coal and nuclear plants. This in turn will be partly passed on to the residents of the area through reduced disposal charges.

- B. The marketplace economics of supply and demand pose particularly difficult problems for planning a resource recovery system. Since the generation of secondary or scrap materials is independent of the market for them, there are wide fluctuations in their marketability and price. For example, in 1974, the local market price for waste corrugated paper ran from almost \$60 per ton down to no market at any price. From September, 1973, to April, 1974, #1 heavy melting steel scrap increased from \$54/ton to \$142/ton at Chicago markets.

1. Without adequate markets for materials and energy generated from resource recovery facilities, new facilities could end up wasting energy, and flooding the salvage market. Several resource persons cited the importance of tying down an energy market before any energy recovery facility is built. Instances were cited where incinerators produce steam that could not be sold, and accordingly is simply released into the atmosphere without any productive use.

As we noted earlier, the recycling level for many metals is quite low. Since scrap recovered from municipal waste is likely to be of a lower grade and less well segregated than conventional scrap sources, it is unlikely to compete well. When it is sold, it may act to decrease the use and retard the price of conventionally processed scrap.

2. The generation of combustible refuse is greatest in the spring and fall, when the need for energy for heating and cooling is at its lowest level. This suggests a system that must either provide an alternate disposal process for surplus waste, or use supplemental fuels to a considerable extent during much of the year.
 3. The location of scrap material processing facilities in this metropolitan area may reduce some marketing problems. This region is fortunate to have one major and several minor processors of waste paper, one steel company and several small foundries that use ferrous scrap, and two glass companies which use glass scrap or cullet in container manufacturing.
- C. The limited experience with resource recovery in this country, and the current interest in and work with new technology, leaves many unanswered questions as to how best to proceed with any resource recovery system. There does not appear to be any one best system of resource recovery at this time. Nor is it clear that any one system is likely to emerge that will continue to work best throughout the potential life of the facility.

For example, we have been told that burning solid waste in the absence of oxygen to produce fuel -- a process called pyrolysis -- may prove to be a highly cost-effective system of energy recovery, yet it appears to be one of the least proven alternatives. At this point, the Monsanto Corporation is completing the first full-scale pyrolysis solid waste disposal and resource recovery plant in the city of Baltimore. Upon completion, it is likely to take a number of months to shake down the initial problems, and perhaps years to adequately analyze its performance.

1. Alternative methods of incineration may vary in their efficiency, reliability, and the value of the materials recovered. Various incineration systems described to our committee differ in terms of whether refuse is to be used as a sole, primary or secondary fuel; whether extensive conditioning of the refuse is required before incineration; and, whether metals would be recovered before or after incineration. The Union Electric St. Louis project uses processed refuse as a supplementary fuel, and the North Boston project will incinerate largely unprocessed refuse and then recover metals from the residue.

Representatives from Wheelabrator-Frye appearing before our committee noted that tin from cans will melt and be lost during their incineration process. However, it is presently unclear as to what effect incineration will have on the marketability of those metals that are recovered.

2. Continuation of landfilling organic materials can lead to a system of methane production at a modest cost. Methane production at a sanitary landfill can present an environmental hazard, but also can be harnessed as an energy source. Pacific Gas and Electric Company is currently utilizing methane gas generated from a landfill 30 miles south of San Francisco. The company is also involved in an effort to extract methane from a landfill outside of Los Angeles, and then add the methane to their natural gas lines.

We were told that if a landfill is from 50 to 90 feet deep, has a good impervious cover, and contains at least one million tons of refuse, it is a candidate for commercial generation of methane gas. Such a landfill should produce methane over a period of approximately 15 years. There are several landfills presently in use in the metropolitan area which will have adequate value over the next few years for commercial methane production.

- D. Some recycling activities may primarily be of public relations value. It has been pointed out to our committee that we have the capability of recycling almost everything. However, it may not be economically feasible.

1. Current recycling of post-consumer glass appears to be costly and of marginal environmental value. Our committee learned that glass is a chemically inert substance produced from siliceous sand, limestone and soda ash in approximately the same percentages in which these materials are found in the earth's crust. In other words, glass comes close to being an environmentally ideal material to use since there is no shortage of the basic ingredients needed for its production, and its disposal presents no particular problems.

The manager of the Rosemount Brockway Glass plant indicated to our committee that they have always recycled glass cullet (scrap) which is generated from breakage at the time of manufacture. However, since 1970 they have been buying post-consumer glass cullet when separated by colors. This was necessitated, for a time, by a shortage of soda ash. This shortage occurred during the transition when increased water pollution standards caused the industry to convert from manufactured to mined soda ash.

Representatives from Brockway Glass explained to the committee that they are currently paying \$20 per ton for glass cullet from most suppliers and an additional \$5 a ton for glass from the Metropolitan Recycling Center. It then costs them 28% more to use recycled glass where \$20 per ton was paid for cullet, and 48% more where \$25 per ton was paid. Although Brockway collects amber and green cullet, they do not re-use them at their Brockway plant. This glass is shipped to other Brockway plants, raising the premium for using recycled glass to about 80%.

2. The utility of recycling other residential wastes may depend on how it is organized, managed and marketed. During the past five years, many Twin City residents began to save their cans, bottles and newspapers to be recycled. This same phenomena occurred all over the country as many groups began recycling projects and recycling centers sprang up. As the effort matured, some of the enthusiasm has died down, programs have been terminated, and it has become apparent that the method of organization and management is important.

Our committee learned of one business which has an arrangement with four community groups in Minneapolis under which it picks up the residents' glass, metals, paper, nylon, and plastics on one designated day each month. Its operator then pays the community groups 10% of the revenue he receives when the materials are sold.

The Metropolitan Recycling Center takes residential cans and bottles at its midway processing facility, and at part-time depots throughout the metropolitan area. To improve their efficiency, they would like to develop permanent, full-time depots at convenient, supervised locations.

Another approach that appears to have worked for some organizations involves establishing at regular intervals collection of a designated scrap at a frequently used point such as a shopping center. In that way a family can dispose of the recyclable material without necessarily making a special trip.

- E. Currently unresolved questions as to the role of public and private parties add to the uncertainties of developing resource recovery systems. The role of government as a potential regulator, competitor, and/or patron of private resource recovery efforts is critically important to potential investors. On the other hand, the public sector may be somewhat obligated to leave to private investors that portion of resource recovery that can be accomplished within the marketplace... even though it is not clear what that is.

1. Public facilities could provide unfair competition to private projects. Should the operators of a private resource recovery facility have to compete with a public agency for refuse or refuse disposal income, several factors could put them at a disadvantage.

Whereas a private facility needs to make a profit and cannot operate for any length of time at a loss, a public agency, being without the profit motive, is free to accept losses directly or disguise them as they allocate costs. The private operator also must pay taxes which do not apply to the public sector; and the private operator will most likely accrue higher debt costs than the public agency with its tax-exempt, general obligation or revenue bonding. Finally, it is reasonable to expect that once a public obligation is incurred, public rules and regulations are more likely to be used to protect the operation of the public facility than its private competitor.

2. It is important to both public and private resource recovery operators to have a reasonable assurance of a supply of refuse and refuse disposal revenue. Since resource recovery facilities tend to require a large capital investment relative to operating costs, reasonable assurances of income to cover the fixed cost payments of principal and interest must be provided.

Incoming refuse for such a facility would most likely provide direct income from disposal charge payments, and indirect income from the metals and energy recovered. Given the other uncertainties inherent in resource recovery at this time, the economic viability of any proposed project may depend on its being able to secure long-term commitments for refuse and/or refuse disposal income.

3. A potential conflict of interest occurs when a public competitor also has regulatory responsibilities covering its competition. Our committee heard serious concerns expressed about having the public agency plan or regulate a resource recovery system, and then operate a portion of it. This concern relates to both counties which have current solid waste management responsibilities and the Metropolitan Waste Control Commission, which has requested the Legislature to give it management responsibility for a regional resource recovery system.
 4. It is unclear what specific assistance parties interested in developing resource recovery facilities can expect from the public sector. The Minnesota Pollution Control Agency does administer a grant-in-aid program to assist governmental units and private parties with 50% matching grants for a resource recovery system.
- V. Resource recovery decisions are likely to have substantial impact on the collection, transportation and ultimate disposal of solid waste. In fact, the secondary economic, energy and environmental effects may have greater costs and benefits for the community than the direct operation of a resource recovery facility.
- A. The process of collecting solid waste may be affected by changes in disposal location, and any segregation of materials required for recycling at the point of generation. Since 80% or more of solid waste disposal costs tend to occur at this point, the changes are very important to the overall economics of the system.
1. The establishment of a given resource recovery facility is likely to influence the routing of collection vehicles supplying the facility. This would occur naturally within the marketplace as haulers using the facility would want to adjust their routes to minimize the time and distance needed to cover their collection stops. Since the location of a resource recovery facility is likely to occur at a central location, a substantial reduction in hauling distances should be achieved.

The establishment of mandatory waste resource districts to assure a supply of refuse for a given resource recovery facility, could have the effect of overriding marketplace decisions by regulation. If the total cost of transportation and disposal is significantly higher at a resource recovery facility, enforcement of the regulations could be difficult. If such a district is too small, efficient collection routes might be difficult to organize.

The establishment of refuse disposal districts is linked by some to the establishment of a system of mandatory collection. Our committee learned that some refuse haulers are concerned that a consideration of waste resource districts would lead to the region's being organized into a system of mandatory collection districts. This, they fear, could lead to competitive bidding, in which larger firms might freeze out the smaller operator. In any case, the local hauler would lose the equity he has built up as he attracted and held customers.

2. Newsprint-to-newsprint recycling is an example of where a separate or segregated system of refuse collection may be necessary. Presently, paper drives and other voluntary efforts are used to divert newsprint from the solid waste stream for recycling. However, if a newsprint-to-newsprint recycling facility is built, a higher percentage of waste newspaper will need to be salvaged. . .perhaps on a household-by-household collection basis.

We may find that other special wastes, such as tires, plastics or motor oil, may also be recovered most economically only through source separation and segregated hauling.

- B. Resource recovery could change, but not eliminate, the need for sanitary landfills. Experience elsewhere has shown that refuse is reduced by incineration to about 25% by weight and 7% by volume. The extraction of ferrous and non-ferrous metals would reduce this percentage to 18% by weight and 5.1% by volume. If glass, fly ash and aggregate were also recovered, the refuse could be reduced to only 4% by weight and 1.1% by volume. The final residue, at whatever amount, would need to be landfilled. Resource recovery plants which shred and air classify refuse before burning reduce the total somewhat less, with a 2/3 reduction by weight.

The incineration of organic material and the extraction of metals reduces the potential of pollution from refuse at a sanitary landfill. In fact, it has been suggested that the residue of such a process could be disposed of in much the same way as we now dispose of demolition debris as a fill material, not requiring sanitary landfill procedures.

CRITICAL SOLID WASTE PROBLEMS TO BE RESOLVED

- I. The waste of materials and energy in our consumption patterns and disposal process is the most fundamental problem presented by solid waste in this metropolitan area, at this time. A continuation of current material and energy consumption, and waste generation practices nationally, would become increasingly damaging to our economy and the environment. Once buried, the materials and potential fuel value in refuse are largely dissipated and unrecoverable.

Ways must be found to: (1) *discourage waste generation by reducing marginally productive uses of potentially scarce materials and energy;* (2) *stimulate an increased demand for recycled materials;* (3) *encourage the orderly recovery of marketable materials and energy from refuse, with minimum public liability on a self-supporting basis.*

- A. Normal adjustments within the marketplace, while important, will not be adequate to reduce consumption and waste generation to the extent needed to best husband the long-term uses of our natural resources. The economic incentives of the marketplace provide a strong, positive force for weighing the direct costs of material, energy, capital and labor to the producer of a product. However, the system does not always work as well in weighing the ultimate cost to the buyer and the general public.

The marketplace does not adequately reflect the overall production cost to the public of such aspects as material and energy depletion, litter generation, waste disposal, environmental impacts, and unemployment. This is not to say that it could or should be the responsibility of the marketplace to calculate and charge for the indirect cost not currently assessed to them.

- B. Recycling presently suffers from a lack of demand for recycled materials, is retarded by public policies favoring the use of virgin materials, and is further limited by the very nature of the salvage and virgin material industries. As a result, the rate of recycling of many available materials is quite low, and has been declining for many years. Therefore, the basic challenge is to increase the demand for, and use of, recycled materials, since an increased supply, independent of demand, could merely decrease the rate of recycling even further.
 1. A pervasive preference by the general public for new goods from virgin materials discourages the use of recycled materials, even when the recycled materials may provide a better value for the consumer. This preference is reinforced by government procurement policies and sold to the buying public by the producers of virgin material products.
 2. While recognizing the value of developing sources of virgin materials, we find it equally, if not more, compelling that used materials be preserved and reused at their highest value. To the degree that virgin resources are favored with tax, transportation and government procurement policies, the public, perhaps unwittingly, discourages the use of recycled materials.

3. The salvage industry. . .rather than fostering stable markets. . . currently provides a most important economic function by absorbing waste materials as they are generated, and making them available to industry as they are needed. Virgin materials, on the other hand, tend to require long-term markets, which will utilize a steady flow of materials from the capital-intensive extraction operation.

During periods when the economy is heated and production is up, industry tends to use a relatively higher proportion of scrap to virgin materials. This increased demand is translated into higher scrap prices. The scrap dealers begin liquidating their inventories, the production of scrap from industry increases, and some additional abandoned or obsolete materials are pulled into the salvage stream by higher prices.

- C. The costs of resource depletion and environmental impacts are not now assessed as part of the expense of burying refuse. These costs, although not fully known or measurable, are real and serious. As alternative proposals for processing waste are considered, some weighting for these factors should be included.

II. Current resource recovery planning and regulation is not adequate to cope with the considerable interest in, and planning for, major projects. Despite considerable study by the Metropolitan Council, Hennepin County, and others, this region does not have any official plan or strategy in effect for encouraging, coordinating, or regulating the recovery of resources from solid waste.

- A. Lack of adequate resource recovery planning and regulation could lead to a duplication of facilities at major public and private expense, an impasse in which all resource recovery investments are blocked, unplanned public subsidy, or an artificially high cost of waste disposal. Not only are the individual resource recovery decisions important to the overall opportunity for the economical recovery of materials and energy from refuse. . .but whatever decisions are made and actions taken on resource recovery are likely to have a direct effect on the collection and/or disposal of solid waste in the region. It could even deter efforts to reduce waste generation.

Resource recovery is emerging as a critical element of solid waste management planning, and should be incorporated as part of an overall solid waste planning and regulatory process. This process should be so structured as to assure maximum public protection against the tax liability or excessive refuse disposal costs due to an uneconomical resource recovery project.

1. The current state of technology and experience with facilities to recover energy and materials from solid waste leave many uncertainties as to what systems, if any, would be cost effective. Relatively low landfill costs and access to moderately priced fuel in the form of low sulphur western coal make resource recovery economics particularly tight in this metropolitan area.

2. The public has an important economic interest in the success of private, as well as public, resource recovery facilities. Once the public comes to use a private resource recovery facility to dispose of waste from a given area, it may become dependent on the facility regardless of disposal charges. This would occur either if alternative disposal sites were phased out, or if public regulation required the use of the private resource recovery facility.
- B. The extensive use of capital-intensive resource recovery facilities may have unanticipated effects on both the salvage and the virgin materials industries. The nature of the process of recovering resources from solid waste would have characteristics which correspond more to the salvage industry in some cases and to the virgin materials industry in others. As with the salvage industry, the supply of materials would operate largely independent of demand. However, the high capital overhead and the production nature of the process would necessitate a stable market more characteristic of the virgin material industry.
1. A steady supply of materials from resource recovery facilities could stimulate new markets for conventional salvage. Since solid waste resource recovery facilities would produce a relatively steady supply of recyclable materials, this could encourage the development of new facilities designed to utilize the recovered scrap. This increased utilization of scrap could also increase the market for scrap from the traditional sources. . . particularly during periods of high production, as the waste recovery facilities would be unable to increase their supply to meet the increased demand.
 2. On the other hand, an increased use of recycled materials will not necessarily result from an increased supply, since competition from materials recovered at new resource recovery plants could displace some waste materials now being salvaged. Higher-grade scrap tends to automatically flow into the salvage stream. However, low-grade scrap may be either salvaged or discarded into the solid waste stream, depending on the current market demand. Extensive recovery of low-grade scrap from solid waste in some communities could saturate the market and cause higher grades of scrap in other communities to be passed over by salvage dealers, and then landfilled. This would be particularly counter-productive if the recovery of materials from solid waste was accomplished on a subsidized basis.
 3. Greater use of recycled materials could reduce the demand for virgin materials from domestic and/or foreign sources. If the use of scrap materials were to increase significantly vis-a-vis virgin materials, this could affect the development and production from domestic sources, or reduce the relative demand for foreign imports. Since projections point to demand outstripping the supply for most materials, greater use of recycling could act as a modest countervailing force.

III. Good refuse collection and disposal service is generally available at a moderate price, but not all Twin City households and businesses have such arrangements. The current solid waste system does not assure an adequate, responsive, competitive collection and disposal of refuse. At the extreme, there are cases where rats feed on uncollected garbage, and hazardous wastes are dumped illegally on the countryside.

A. Refuse collection in the metropolitan area, although generally good, varies widely in price, method of payments, options available, and the enforcement of community standards. Some of this variation is the result of the way refuse collection is arranged in different communities.

1. Private arrangements found in St. Paul and most suburbs offer consumer choice. . .perhaps at the expense of efficiency, community protection, and effective competition. In many ways, this system tends to be the most responsive arrangement for the individual household. Often the home owner has both choices both as to who will collect his refuse and the nature of the service he will receive. This can vary in frequency, the amount and nature of the items which will be routinely collected, and where on one's property the hauler will go to pick up the refuse.

On the other hand, the system can be inefficient if a number of haulers all collect refuse from the same block, and/or if individual haulers by providing different services to different customers on the same route are unable to organize any of the services with optimal efficiency. Such a system can burden a community with extra wear on streets and alleys, or fail to assure that all residents will have arranged for adequate service. Without readily available price and service information, the choices available to an individual homeowner may not be meaningful or the competition effective.

2. The negotiated arrangement between the City of Minneapolis and Minneapolis Refuse, Inc., provides assured, efficient collection without consumer choice or direct competition. Our committee was impressed with many of the characteristics of the Minneapolis refuse collection system. A regular, efficiently organized collection service is furnished all households; a consumer complaint mechanism is provided; and the division of collection in the city between M.R.I. and the city's own crews provides a limited means of cost control.

However, the system precludes consumer choice of hauler and the type of service to be provided. Perhaps more important, the system does not provide meaningful price and service competition. We seriously question whether the cost of a publicly operated service, in the long run, will provide a realistic yardstick of what should be expected from the private sector.

3. Competitive bidding for municipal collection may be the most cost-effective system. This arrangement also assures a regular, efficiently organized collection service for all households. It has the added advantage of assuring that the cost savings of the system's efficiency are passed on to the public. Even new multi-year contracts let this year, without escalation clauses, tend to be at or below the current rates available through other arrangements for comparable services to the individual household.

The chief disadvantage to this arrangement appears to be the lack of consumer choice.

4. Direct collection by municipal employees may be the least competitive system. As with other municipally organized systems, adequate, regular service is assured. . .and it can be a cost-effective system. However, it lacks the strong incentive for efficiency that a profit motive and competition can provide.

The St. Paul experience, with competition among city and private haulers, shows that collection by city crews there has been substantially more expensive on a per-household basis.

5. Responsiveness to both individual and community needs is important. The collection of one's own household waste is very important, but so is the collection of one's neighbors' waste. The refuse collection system should be responsive to the needs and desires of the individual household. . .including a reasonable assurance that the neighbors will also have an adequate refuse disposal arrangement.
6. Municipal funding can be efficient, and assure adequate collection, while providing income tax deductibility when paid from general tax revenue. The efficiency comes by either attaching refuse charges to billings for other assessments, or incorporating them as part of the services provided from general tax revenue. Since payment for the service is assured, there is no incentive to the household not to use it.
7. Competitive bidding could jeopardize a hauler's investment and take away his earned equity in accounts or customers built up over time. The same phenomena occur throughout the marketplace whenever one product or service is replaced by a more efficient or attractive alternative. In this case, however, the change is somewhat different, as it would be initiated by government action.
8. Conditions in St. Paul provide an opportunity to develop a model refuse collection system. St. Paul presently has some serious problems with uncollected and inefficiently collected refuse, and the city is prepared to pursue a new system. As St. Paul moves from a system of private arrangements, every effort should be made to assure a system that remains responsive to individual residents, while assuring the city of an adequate, efficient, competitive process.

B. Refuse disposal in this metropolitan area is well-managed and inexpensive by national norms, although current procedures pose potential environmental, political and regulatory problems.

1. Groundwater pollution from sanitary landfills is a potentially serious problem. Part of the problem is that there is not adequate experience to show what consequences we might expect from continuing current practices, and what steps are warranted at this time. It is unclear when the contamination might occur, how damaging it would be, and how costly or effective any treatment procedures initiated at that time might be.

2. The landfill disposal system in this area has elements of both a competitive and a captive market. As a practical matter, the cost of hauling refuse is sufficiently high as to effectively restrict many refuse collectors' choice to the one or two closest landfills. However, the level of choice throughout the region appears sufficient to keep the price reasonably competitive.
3. The inspection and supervision of sanitary landfills may vary widely by county. For example, a consultant to the Metropolitan Council found that Dakota County, with its concentration of sanitary landfills, employs only two people with solid waste responsibilities: the highway department engineer, and the chief of environmental evaluation. Hennepin County, on the other hand, employs 11 persons with solid waste responsibilities.
4. Landfills will be required in this region for the foreseeable future . . . to handle unprocessed waste, to dispose of residue from any resource recovery plants, and to provide standby capacity in case of a stoppage at such facilities. Incineration and recycling can substantially reduce solid waste, but landfills remain the one environmentally acceptable process now available for the ultimate disposal of waste. Therefore, the question is not whether we will have landfills, but how much landfill capacity will we need, what materials will we dispose of in this manner, and what procedures will we use at the landfills.
5. Although there is adequate total physical capacity at existing landfills for some time to come, portions of the region may require that new sites be developed, or increased transportation costs will be incurred. With the closing of the Washington County landfill, much of the eastern portion of the metropolitan area is without access to a reasonably close landfill. It is unclear how well the shared responsibility of the MPCA, the Metropolitan Council, and the individual county will work to establish an additional landfill in this case, or others in the future.
6. Political, environmental and economic problems may deter the development of new landfills, or even an increase in the licensed capacity of existing landfills. While it is clear there is ample land available with the physical capacity to meet the region's landfill needs, it is less clear how much land in the region is environmentally suitable for a landfill or where a landfill might be located without encountering local political resistance.

It is likely to be increasingly difficult to find landfill sites that are environmentally and politically acceptable. Even localities which have already accepted current landfills may resist increasing the license capacity at these sites.

- C. Hazardous waste presents a potentially serious problem. . . one which federal funding may help relieve. With the assistance of a \$3,720,000 federal grant from the Environmental Protection Agency (EPA), this area has an opportunity to develop a facility to salvage, neutralize, or safely landfill much of the state's hazardous waste. However, it is unclear how a \$1,240,000 local match should be funded, and what governmental unit should own such a facility.

OUR PROPOSAL FOR AN IMPROVED PROCESSING OF NECESSARY SOLID WASTE

- I. *To encourage an orderly, cost-effective recovery of energy and marketable materials from refuse, and reduce the area's reliance on sanitary landfills, we recommend that:*
1. The Minnesota Legislature should establish an orderly process for planning and regulating the recovery of materials and energy from solid waste by:
 - a. Extending the statutory responsibilities of the Minnesota Pollution Control Agency (MPCA) and the Metropolitan Council for solid waste to specifically cover resource recovery facilities, and
 - b. Requiring that any major facility to recover energy or materials from refuse in the metropolitan area must be approved by the Metropolitan Council.
2. The Minnesota Legislature should specifically authorize counties and municipalities in the state to issue revenue bonds to finance facilities to reduce solid waste through incineration with energy recovery, and/or the extraction of marketable materials. However, given the economic uncertainties of resource recovery from refuse, the Legislature should specifically deny the use of general obligation bonds for this activity. This would assure a significant check on the project's economies by potential bondholders, as well as a reduced level of public liability.
3. The Minnesota Legislature should direct the Metropolitan Council to review and comment on any long-term refuse disposal agreements between a metropolitan municipality or county and a waste treatment or disposal facility. Without such a review, local actions could inadvertently, or deliberately, thwart the overall interests of the region in resource recovery.
4. The Minnesota Legislature should not provide for any subsidy to resource recovery facilities. The House Local and Urban Affairs Committee should delete a provision in the Senate-passed resource recovery bill which would authorize the Metropolitan Council to establish mandatory districts from which all refuse would be required to go to a specified resource recovery facility.
5. The Metropolitan Council should attempt to keep the region's solid waste processing options open by favoring projects which add competition among different providers and different systems. This does not necessarily mean that a full range of projects can be or should be initially programmed at the same time. Rather, it supports a process in which resource recovery facilities must compete not only against environmentally adjusted landfill costs, but increasingly against other resource recovery arrangements as well.
6. The Metropolitan Council should limit its approval of energy recovery facilities to a total capacity for processing refuse that can be supported without subsidy or an increased generation of refuse. The region must not allow itself to get into a position where a demand for unnecessary refuse generation is created by a surplus resource recovery capacity.

7. The Metropolitan Council should help protect the general public against a liability for uneconomical resource recovery programs through its criteria for approving such facilities. Accordingly, preference should be given to essentially privately funded and managed projects. Public projects which do not incur a general public obligation for debt retirement or operating expenses should be given a priority over those that do. The operation of a private, or public, facility as an enterprise selling a product to others provides a strong incentive to operate in a cost-effective manner.

Three major proposals are pending in the Twin Cities metropolitan area for construction of resource recovery facilities. Serious questions exist about the likelihood of an economically viable supply of refuse if all three were to be approved. We do not believe the Metropolitan Council should take action on any one of the three until it conducts evaluation of all and can compare each against the other. Action on any one at this time could have unintended impact on the other two. For example, if not enough refuse is likely to be available for all three, approval of the first project means that one or both of the others won't be able to proceed. If a proposal is to be rejected, that decision ought to be made consciously. A proposal ought not be rejected simply because it is second or third in line.

Our criteria would lead us to rank the proposed private project to produce steam for Hoerner-Waldorf Corp. over the proposed steam generating project by Hennepin County and both of these over the Metropolitan Waste Control Commission's project to use refuse in the process of drying sewage sludge. However, a complete, comparative analysis is not yet available for the three projects. We recommend the Metropolitan Council set strict deadlines for submission of comparable information by supporters of the three projects and that then the Council decide whether to approve all three, none, or one or two of them.

8. Local governmental units should avoid potential pressure to produce solid waste by rejecting any long-term agreements to supply refuse to a waste processing facility, if a minimum quantity is specified. This does not mean that a community should not be willing to commit its refuse in relation to what is generated, or even commit itself to a minimum disposal fee.
9. Local governmental units making long-term refuse disposal commitments to resource recovery facilities should insist that the refuse disposal charge be reduced with an increase in value of energy and materials recovered. At the same time it is reasonable to expect that long-term commitments will most likely call for adjustments tied to inflation-related cost increases.

II. To encourage the efficient, responsive collection of refuse in the metropolitan area, we recommend that:

1. Specific refuse collection arrangements should be left to the individual municipality, with no attempt to be made at developing county-wide or regional systems. A diversity of collection arrangements in the region should be encouraged and expanded upon to keep incentives for efficiency high through competition. Such diversity would also help protect against the paralyzing effect of work stoppages seen in other parts of the country.
2. The City of St. Paul should provide a municipally financed, mandatory residential refuse collection system. In developing such a system, there should be competition not only between public and private collectors, but among diverse private collectors as well.

3. Suburban communities not now providing a mandatory, municipally financed system of refuse collection should investigate the comparative cost and benefits of such a system. Where such systems are provided, effective procedures should be provided for handling complaints. The municipal financing can be handled in a number of efficient ways, including the use of general tax revenues and attaching refuse charges to billings for other municipal assessments.
4. The City of Minneapolis should consider not only the collection costs of its own crews in negotiating an agreement with the incorporated association of private haulers, but also the comparative cost of suburban contracts. The bidding of a small portion of the city could be used as an additional check on the market price of the service. If a competitive agreement is not reached, the city should explore a complete system of competitive bidding.

III. *To encourage the efficient regulation and disposal of hazardous waste, we recommend that:*

1. The State of Minnesota should own the hazardous waste chemical landfill proposed to process waste for the entire state and, accordingly, provide the local matching funds required. If, for some reason, the State is unwilling to own such a facility, the State should still fund the local match for the program.
2. The Minnesota Legislature should assign the detailed regulation of hazardous waste materials in the metropolitan area to the Metropolitan Council to be administered for the Council by the Metropolitan Waste Control Commission .

IV. *To promote the salvage and re-use of scrap materials at their highest levels, we recommend that:*

1. The United States Congress should pass legislation insuring that secondary or scrap materials receive at least equally favorable tax treatment to virgin materials, and that freight rates reflect no more than the true burden of hauling scrap materials vis-a-vis virgin materials.
2. Congress should authorize the Environmental Protection Agency (EPA), the Department of Commerce, or some other appropriate agency to develop a mandatory coding system, where practical and needed, to facilitate efficient segregation for recycling. A code number would then be affixed to each of the recyclable items. This would be particularly valuable with plastics and certain metal alloys, where the salvage value is high but accurate segregation is presently difficult and costly.
3. The MPCA should develop new proposals to encourage the collection and salvage of specific recyclable items, using the current auto hulk program as a model. Some form of excise tax or deposit should be used to indirectly fund innovative collection and recycling programs for the items covered. We are not recommending a dedicated fund, but, rather, that the State's general fund be roughly reimbursed for the cost of the program. Once the MPCA's proposals are developed, the Legislature should give them careful, serious consideration.

4. The Minnesota Pollution Control Agency should develop a guide for using recycled materials for agencies of state and local governments in Minnesota. This guide should be sent to all governmental purchasing units in the state, and made available to the general public. Governmental agencies at all levels should then review their material procurement policies to insure that they do not discriminate against items made from recycled materials. To the degree that items from recycled materials meet minimum standards and are competitive, they should be given preference by governmental agencies and groups doing work with governmental agencies.

V. To reduce waste and encourage the judicious use of natural resources, we recommend that:

1. The Congress should mandate the development of standard or interchangeable containers in even-unit sizes as part of the conversion to the metric system. The U. S. Department of Commerce, working with the Environmental Protection Agency and industry, should develop standards for the interchangeable containers which would facilitate their re-use in the home, for return and re-use as containers, or for recycling. The use of these standard containers, once established, should be encouraged through an excise tax on non-conforming containers or some other equally strong incentive. Such standardization would not only encourage re-use or recycling, but would also improve productivity in handling and simplify price comparison by consumers.
2. The Congress should rescind legislation preventing the re-use of liquor bottles, and specifically direct the U. S. Treasury Department to pass regulations which encourage the use of standard, reusable liquor containers.
3. The Minnesota Legislature should enact legislation favoring the use of reusable carbonated beverage containers over non-reusables. One approach would be to ban the use of cans and non-returnable bottles. A second would require a mandatory deposit be placed on all beverage containers.
4. The MPCA should continue to work with private industry to add specificity to its packaging review regulations. However, case experience under the regulations should help eliminate much of the current uncertainty.
5. The MPCA Board should direct its staff to identify any packages already in use in Minnesota before May 25, 1973, which appear to create special environmental problems. Following the review, the MPCA Board should recommend legislation to discourage the sale of any containers or container types whose continued use the Board finds would be particularly detrimental to the environment.

FURTHER DISCUSSION OF OUR PROPOSAL

- **** *Is there an adequate supply of refuse to support the three major resource recovery facilities currently under consideration?*

There is just enough refuse generated during the coldest portions of the year to support all three proposed plants. However, the cost of transporting refuse in from the very fringe of the metropolitan area would be high. . .and it appears that a substantial subsidy would be required. Moreover, it is most unlikely that all the refuse could be diverted to the three facilities without mandating it by statute.

The three projects together require about 3,600 tons of refuse per day. This compares with an average of almost 5,000 tons of mixed refuse generated per day in the seven counties. However, the amount generated during a several week period in the coldest part of the winter drops to less than three-fourths of the average. In addition, only 70% of the region's solid waste is generated at a distance closer to one of the three proposed facilities than an available sanitary landfill.

This means that there is less than 2,700 tons per day of burnable refuse available during periods of peak energy demand, without incurring additional fuel consumption in transporting refuse. If Washington County replaces its sanitary landfill--as the MPCA has directed it to do--the figure would be further reduced.

- **** *Why isn't the availability of non-local funding included as one of the criteria for prioritizing resource recovery projects?*

It does not appear that any of the projects would receive any federal funding that would not otherwise be available to the region. While the Environmental Protection Agency apparently encouraged the Metropolitan Waste Control Commission to develop its pyrolysis proposal for disposing of sewage sludge, the money for this project would come from waste water treatment funds normally available to the state and the region.

- **** *How serious would it be for the Metropolitan Waste Control Commission to miss the Minnesota Pollution Control Agency's September 1 deadline in submitting its sewage sludge treatment proposal?*

The answer to this question is not entirely clear at this time. The MPCA does have flexibility in this regard. The money would not actually be lost to the region and the state unless the MPCA does not make its proposal before the end of the current fiscal year July 1, 1976.

In the past, the MPCA has accepted late proposals from the Waste Control Commission, and to deny requests based on the failure to meet the September 1 deadline would represent a departure from past practices by the MPCA.

**** *How does the proposal encourage an orderly, cost-effective recovery of energy and marketable materials from refuse?***

Public and private parties interested in developing resource recovery facilities do not now have the benefit of a regional plan or strategy for resource recovery or even the basic rules and regulations likely to be established. We recommend giving the Metropolitan Council the specific authority and responsibility to develop and implement a resource recovery strategy. Once this is done and the ground rules are established, the various actors will be able to more accurately assess the feasibility of their plans, and proceed accordingly.

The Metropolitan Council, by initially restricting its approval of resource recovery facilities to a total capacity that can be economically supported at existing waste generation rates, would provide a most significant assurance to the investors in a resource recovery facility.

Our proposal would also assist the orderly development of resource recovery by coordinating local action to conform with regional resource recovery needs.

Once experience has established what portions of the refuse in the region can be processed without subsidy, our proposal then provides a means of encouraging varying amounts of additional resource recovery by adjusting the cost of using sanitary landfills.

**** *Why doesn't the proposal support the establishment of waste resource districts and other forms of direct assistance to resource recovery facilities?***

As we described earlier in our report, there is a great deal of uncertainty as to the best procedure for recovering materials and energy from refuse. Presently there is a great deal of experimentation taking place throughout the nation and the world to find out what approaches work best. Since we are not confronted with any crisis here in the Twin Cities that requires hasty action, we can afford to proceed with caution, gaining from the mistakes of others.

It is presently unclear whether any direct assistance to resource facility operators will be required to attract major new facilities here. It is also unclear as to whom the direct assistance ought to go.

Under legislation having passed the Minnesota Senate, the Metropolitan Council would have authority to establish waste resource districts to assure a supply of rubbish to the operator of a resource recovery plant. We have a number of problems with this approach:

First, it places the potential subsidy of the facility on a rather narrow base of individuals and firms within the established district. If the disposal charge at a resource recovery facility is not competitive, the system would encourage

cheating. On the other hand, if it is competitive, it would not be needed. The system also lacks flexibility, and would be hard to administer and enforce. Perhaps most important, the establishment of each waste resource district would be a separate decision, possibly giving unequal treatment to competing facilities.

- ** Why does the proposal recommend local governmental units use revenue bonding for resource recovery plants?*

Private money markets provide a proper place for risk analysis. On the other hand, the public sector with its political pressures is less likely to objectively evaluate the risk. In order to sell revenue bonds, more thorough cost analysis will be required than to sell general obligation bonds.

Revenue bonding has the advantage of placing both public and private facilities in a more comparably competitive situation. It helps relieve public liability in the case of failure, and revenue bonding provides a strong incentive to operate a facility in the most cost-effective manner.

- ** How can refuse arrangements in St. Paul best be handled?*

We feel it is most important that St. Paul move to a municipally financed, mandatory residential refuse collection system to improve efficiency and sanitation. This could be funded as a utility charge to the property, or through general tax revenue. The important aspect is that each house would be provided with a regular collection service.

A mandatory collection system allows a much more efficient system of collection. However, unless meaningful competition among private collectors is built into the system, this efficiency may not be wholly passed on the public. Accordingly, we recommend the city go to mandatory collection on a competitive bid basis, or provide a check on the city-arranged system by allowing individual neighborhood communities to arrange their own collection with the money the city would have normally spent for the service in that area.

Under a competitive bid system, individual bidding should be done on a small enough basis to allow the very small operator to compete. Bids also should cover at least a five-year period to allow an amortization of a refuse collection vehicle.

If the City of St. Paul enters into a negotiated contract with an association similar to the Minneapolis system, individual neighborhood communities should be allowed to contract with the city, to make their own arrangements, as long as they meet minimum city standards. Any savings could then be passed on in additional refuse service, or other community functions. The city would benefit from having an independent check on the competitiveness of their agreement with the private association.

*** How about the Minneapolis and suburban collection systems?*

We found that the suburban communities contracting with private haulers for municipal collection appeared to achieve a substantial cost saving for the residents. We are sufficiently impressed with the benefits of the Minneapolis approach that we are not recommending it be abandoned. Rather, we are recommending additional checks be applied by the city as part of the negotiation process. Only if a reasonably competitive agreement is not reached with Minneapolis Refuse, Inc., does the city need to explore an alternative system.

On the suburban side, we feel each community should look at its own situation and determine whether its residents would be better served by a different system. We suspect that a mandatory, municipally financed system would be more cost-effective for many suburban communities.

*** Why didn't the proposal make a specific recommendation on which alternative approach should be used to discourage non-reusable beverage containers?*

Our committee concluded that the re-use of carbonated beverage containers as beverage containers is in the public's interest, and the use of non-reusable beverage containers places an economic and environmental burden on the general public. This burden not only includes additional litter generation and refuse disposal costs, but also waste in the form of unnecessary materials and energy consumption. Some committee members felt that these problems were sufficiently important to warrant the banning of non-reusable containers. Short of banning, the same members generally favored mandatory beverage container deposit to discourage the use of non-reusables, and, when used, their return for recycling.

Other members of our committee did not feel the problem was sufficiently serious to warrant denying the customers or producers the non-returnable option. Rather, they felt a better approach is simply to tax the use of these containers to cover the economic and environmental cost to the general public.

An outright ban on non-reusable carbonated beverage containers would be expected to drastically reduce their use in the state, and in the process to reduce litter and waste from beverage containers.

While some of the data from Oregon is conflicting, it is clear that the mandatory deposit legislation in that state has resulted in a reduction in the use of non-reusable containers, a substantial reduction in litter from beverage containers, and an increase in the return rate of reusable beverage containers. It also has stimulated public awareness of environmental issues, and strong public support.

A drawback to the deposit approach can be that the users of non-reusable containers are burdened with either forfeiting their deposit or incurring the nuisance and expense of returning the container when there is little or no economic value in doing so. This places a burden on the consumer, the retailer, and the processor. However, by providing for recycling depots to act as the redemption centers for non-refillable containers, much of this burden could be reduced.

COMMITTEE ASSIGNMENT

The Citizens League's interest in solid waste issues extends back a number of years, and includes a 50-page report in 1966 on "Metropolitan Area Refuse Collection and Disposal".

The Board of Directors of the Citizens League, recognizing an increased concern and interest in a number of solid waste issues, scheduled a new committee to begin work on the topic in the fall of 1974. Instructions given to the committee read:

"New Directions for Managing Solid Waste. The Twin Cities metropolitan community is faced with many questions on solid waste: Should the emphasis continue to be chiefly on disposal of whatever waste happens to be generated? Or should more attention be placed on salvaging waste for re-use? We will pay particular attention to the role of the individual householder, who today has very little incentive to carry out any program of separation of his solid waste to assist in recycling efforts. "

COMMITTEE MEMBERSHIP AND PARTICIPATION

The committee had the active participation of 22 members, and was chaired by Joan Forester, a Minneapolis housewife. Staff assistance was furnished by Calvin Clark, Citizens League membership director, and Jean Bosch, Citizens League clerical staff.

In addition to Chairman Forester, the following members served on the committee: Leonard Addington, Robert L. Benson, Edward B. Chapin, Jr., Daniel J. Dunford, James Duprey, Leo Foley, Gerard D. Hegstrom, David Hozza, Frank Jewett, Gary Joselyn, Gerry Kaminski, John Leadholm, Frank T. Mabley, Susan Mindel, Charles F. Murphy, Mary F. Poppleton, Edwin H. Ross, Irving M. Stern, Albert Trostel, Dale W. Ulrich, and Leslie C. Weber.

In addition to the committee members, meeting notices and minutes were sent regularly to interested individuals with such groups as the Metropolitan Waste Control Commission, Hennepin County, Hoerner Waldorf, refuse haulers, and consultants. A number of these individuals attended committee meetings from time to time.

We were fortunate to have in regular attendance Mr. Chuck Kutter of Minneapolis Refuse, Inc., Mr. Ed Gregory of G&H Sanitation, Inc., Mr. Dave Locey of the Minnesota Soft Drink Association, and Ms. Karen Wendt from the Minnesota Pollution Control Agency staff. In a sense they served as extra resource persons providing a continuing source of information throughout the study.

COMMITTEE ACTIVITY

The committee met 35 times from November 26, 1974, to August 12, 1975. During the first seven months the committee held 2½-hour weekly sessions, which were then extended to 4-hour meetings to complete its work in July and August. Excellent attendance was shown throughout the entire period.

From the November start-up to mid-April, the committee received extensive written background materials, and discussed various aspects of the topic with 49 resource persons. They represented such diverse interests as refuse collection, transfer and landfill; legislators; solid waste consultants; scrap dealers; and

The following persons met with the committee as resource persons for one or more sessions:

Harold D. Field, Jr., chairman, Minnesota Pollution Control Agency board.
Prof. Perry L. Blackshear, director, Center for Study of Physical Environment, University of Minnesota.
Floyd J. Forsberg, solid waste consultant.
Ronald Shobe, president, Minnesota Solid Waste Association, and commercial refuse hauler.
Ronald Fellman, solid waste consultant.
Ronald Matros, solid waste consultant.
Raymond Thron, environmental engineer, Metropolitan Council.
Larry Dobbins, Phoenix, Inc., and chairman of the Landfill Division, Minnesota Solid Waste Association.
Weston Fisher, Minnesota Energy Agency.
James Brenda, Minneapolis Health Department.
Robert Hutchison, Anoka County Health Department.
Ralph McGinley, Metropolitan Inter-County Council.
Robert Silvagni, director, Solid Waste Division, Minnesota Pollution Control Agency.
State Representative Walter R. Hanson.
State Senator William G. Kirchner.
State Senator Hubert H. Humphrey III.
State Representative James E. Ulland.
James (Ted) Shields, Minnesota Association of Commerce and Industry.
David Locey, Minnesota Soft Drink Association.
Alan Green, Red Owl Stores, Inc.
Loren Klitzke, Hoerner-Waldorf Corp.
William Petryk, 3M Company.
Charles Turpin, The Pillsbury Company.
Karen Wendt, Minnesota Pollution Control Agency.
Robert Howard, Recycling Research, Inc.
Charles Reynolds, Reynolds Aluminum Recycling Center.
Rick Rosen, Institute of Scrap Iron and Steel.
Sol Kronick, National Association of Recycling Industries.
Robert Raab, Progress Foundries.
John DuRand, Metropolitan Recycling Center.
Milton Knoll, Hoerner-Waldorf Corp.
Arnold Cameron, Brockway Glass.
Maurice Dorton, Metropolitan Waste Control Commission.
Lonnie Dye, Metropolitan Waste Control Commission.
Edward B. Chapin, Jr., solid waste investment analyst.
Frank Borchardt, solid waste consultant.
Luther Nelson, chief, Environmental Division, Hennepin County Public Works Department.
Eugene L. Pollock, editor, Solid Waste Management Refuse Removal Journal.
Chuck Kutter, Minneapolis Refuse, Inc.
Dean DeCourcy, Browning-Ferris, Inc.
Ed Gregory, G&H Sanitation, Inc.
Emil Schlottke, private salvage collector.
James Challas, Hoerner-Waldorf Corp.
David Hozza, president, St. Paul City Council.
Daniel J. Dunford, director of St. Paul Public Works Department.
George Oxford, president, St. Paul-Suburban Refuse Association.
Timothy P. Ahlstrom, Wheelabrator-Frye, Inc.
Samuel E. Standrod, Jr., Wheelabrator, Frye, Inc.

Following this extensive input from background materials and resource persons, the committee developed multiple drafts of findings, conclusions, and then recommendations. The final drafts were incorporated into this report. Data in the report were collected during the input portion and generally reflect 1974 figures.

Our committee wishes to express special appreciation to Eugene Pollock from the Solid Waste Management magazine for flying from New York to specifically meet with our committee. We also want to acknowledge the excellent cooperation from the following local people who provided the committee staff with a continuing flow of information and counsel:

Robert Silvagni and his entire staff from the Solid Waste Division of the Pollution Control Agency were most helpful.

From the Metropolitan Waste Control Commission we received excellent input from discussions with Joseph Strauss, chairman, Richard Dougherty, chief administrator, Lonnie Dye, engineer, and particularly Maurice Dorton, governmental programs division.

Likewise, Dave Winter and Luther Nelson from Hennepin County were most generous with their time and information throughout the study.

Finally, Ray Thron and Sheila O'Connell of the Metropolitan Council staff furnished extensive information and assistance.

APPENDIX A
METROPOLITAN STAFF SUMMARY OF
CURRENT SOLID WASTE RESOURCE RECOVERY PROPOSALS

City of St. Paul Steam Generation

The City of St. Paul recently asked Henningson, Durham & Richardson (HDR) to do a feasibility study on the steam heating/cooling facility on Hill Street near West Publishing Co. NSP presently owns and operates this facility which provides central steam to downtown St. Paul.

HDR will determine the economics of city ownership and whether or not a new steam facility is required to upgrade existing service. If a new facility is required, the possibility of using solid waste as a supplemental fuel will be determined.

The City of St. Paul is not proposing a resource recovery plant. However, the City will determine if it is a customer for shredded solid waste (quantity presently unknown) through its feasibility study. This is the first consultant study of the project and construction is at least five years away if feasibility is shown.

Danny's Transfer and Recycling Station

Located at 359 South Robert Street in St. Paul, Danny's Transfer salvages metals and paper from the rubbish when the market is good. Currently, iron, copper wire, and brass fittings are pulled before transport to Pine Bend landfill. On a good day, 20 cu. yards of rubbish are taken in which is equivalent to 5 tpd (conversion factor is 500 lbs. = 1 cubic yard.) Usually only 5 cu. yards or 1.25 tpd is taken in.

Hennepin County Pyrolysis

The county proposes to dispose of the hospital/health care wastes from the seven county area totaling 110 tpd at either of two sites depending on feasibility: the new Hennepin County Medical Center Complex or the University of Minnesota. Since the economics of an energy recovery facility are generally enhanced by increased tonnages, the actual facility might be from 300-600 tpd. Also, the 110 tpd would have to be increased in order to meet energy needs of customers. The U. of M's energy requirements, for example, are equivalent to 600 tpd. Wastes other than hospital/health care therefore will probably be needed. These wastes might be from residential, commercial or industrial sources or of the special waste category such as wood wastes, tire shreddings, hazardous waste, etc.

Hennepin County Steam Generation

The most recent HDR feasibility study calls for first stage construction of a shredding and firing facility in the West Bank/Industry Square area to shred 1800 tpd. This facility could be on line in the late 1970's if metropolitan approval moves swiftly. A second facility will be on line in 1990, possibly located in Plymouth, to process an additional 1000 tpd. The firing facility would be located in the West Bank/Industry Square Area and have the following potential customers:

Cedar-Riverside
University of Minnesota
Augsburg College
Minnegasco Energy Center
Fairview Hospital
Metropolitan Medical Center
St. Mary's Hospital

Metro Refuse and Recycling Transfer Station

Located at 318 Water Street in St. Paul, this transfer station processes to 50 tpd. Materials such as metals and paper are salvaged before transport to the Pine Bend landfill. Compacted refuse, hazardous wastes and large tree stumps are prohibited. Equipment consists of a large stationary compacter and a 25 yd. truck compacter.

Metropolitan Waste Control Commission - Pyrolysis

See Karl Burandt's memo "Pyrolysis Process at the Metropolitan Waste Water Treatment Plant" dated June 25, 1975.

Occupational Training Center

A report prepared by Whiting Associates and Enright Associates for the Occupational Training Center, Inc. (OTC) of Saint Paul entitled, "Solid Waste Recovery Feasibility", was rejected by the OTC Board of Directors because of the poor markets for compost. The proposal was to pull metals and wood from the waste stream, composting the remainder, and market the compost.

Since the rejection of this composting plan, OTC's plans for expansion have included four areas:

- 1) Municipal contracts that would provide for source separation of paper, metal, plastics and glass wastes when markets are good.
- 2) Contracts with industrial firms for metals, plastics and wood wastes
- 3) Wood Waste Disposal

Minnesota Statutes 1975, H.F. 1288 provides \$700,000 to counties and municipalities with populations over 80,000 on a matching fund basis. Together with the Cities of Minneapolis and St. Paul, OTC plans to utilize these funds to build a large wood chipping operation at the old Pig's Eye Landfill site to help dispose of diseased trees in the Metro Area. Each city in addition to OTC would contribute \$50,000 to be matched by H. F. 1288 for a total of \$300,000 for the operation. Land and labor costs are additional and will be assumed by OTC.

4) Shredded Fuel

Since present projections for needing bales of shredded waste to be used as fuel are minimal, OTC is not presently planning on shredding raw refuse. However, when and if the markets increase, they can get into the business quickly, according to OTC.

Phoenix, Inc.

Phoenix proposes to build a 1200 tpd steam generation plant to meet energy needs of Hoerner Waldorf most likely on 15 acres of industrial land along Wabash between Vandalla and Cleveland. (See two attached newspaper articles.)

Poor Richards, Inc.

The proposed recycling and transfer station is to be located at 400 Whittall Street, St. Paul and is intended for the purpose of serving the residents, householders and small commercial businesses in the area which prefer to haul their refuse themselves. Refuse accepted at the site will be essentially mixed municipal refuse including such items as bulky appliances, machinery and furniture. Toxic and hazardous wastes will not be accepted. The applicant proposes to recover all salvable material to subsequent re-sale and to transport all non-salvable materials to a sanitary landfill. This is not a transfer station in the usual sense because the site is not open to commercial haulers. The site is open only to the general public.

Resource Recovery, Inc.

This local firm is made up of Whiting Associates, the consultant who did the statewide recycling feasibility study for the Occupational Training Center of St. Paul. As a result of this research, they have formed their own proposal for the seven county Metropolitan Area. They propose to construct two major facilities at an estimated cost of \$20 million. Two major facilities would handle all of the Area's waste, one to the west of the City of Minneapolis and to the east of the City of St. Paul, although both locations have not been specified as yet. Rubber, plastic and metallics would be separated from the refuse and the shredded remainder sold as organic compost. Markets other than midwestern have been identified with the added possibility of foreign compost markets. Financing arrangements could be one of two arrangements: 1) a municipality or county through industrial revenue bonds who would own/operate the facility and possibly lease it back to Resource Recovery, Inc., or 2) private investment capital.

Ron Shobe's Transfer Station

Previously the North Hennepin Recycling Transfer Station, Ron Shobe purchased and has operated this salvage facility since February 1, 1975. The following list is a summary of salvage activities at this site ranging from 40 to 88 tpd.

<u>Material</u>	<u>Equipment</u>
Wood chips	Tree chipper
Iron & metals	2 roll off boxes
	1 semi-trailer
Auction items (e.g. bicycles)	1 semi-trailer
Newsprint	1 semi-trailer
Noncompactible	3 roll off boxes
Material such as construction debris	
Nonsalvageable refuse remainder	Large, stationary compacter

This operation has proven to be financially successful and will be even more so when the corrugated market returns. This paper is now being compacted and sent to the landfill with a 60-70% volume reduction because of compaction.

customer for baled, shredded solid waste depending on feasibility.

FACILITIES REQUIRING REFUSE AS GENERATED (*indicates facility already in operation)

FACILITY	LOCATION	MUNICIPAL WASTE NEEDED	SPECIAL WASTE NEEDED	WASTE SOURCE	TECHNOLOGY	TIMING
anny's Transfer and Recycling Station	359 S. Robert, St. Paul	1 to 5 tpd	None	City of St. Paul	Manual separation of paper & metals	In operation
Hennepin Co. Pyrolysis	Either U of Minn. or Henn. Co. Medical Center	Possible 490 tpd	110 tpd hospital/health care	Hosp./Health Care from 7 counties, City of Mpls municipal waste special waste	Probably Torrax pyrolysis system	Possibly 1979, 3 or 4 years
Hennepin Co. Steam Generation	shredding facility in Plymouth	1000 tpd	None	Waste of Hennepin Co.	magnetic separation air density classification	1990
	shredding & firing facility/ West Bank Area	1800 tpd	None	Waste of Hennepin Co.	Waterwall boiler	Late 1970's
Metro Refuse & Recycling Transfer Station	318 Water Street, St. Paul	50 tpd	None	City of St. Paul	Manual separation of paper & metals	In operation
MWCC Pyrolysis	Metro Wastewater Treatment Plant	720 tpd	None	Area of St. Paul/ Ramsey Co. & Northern Dakota	Pyrolysis	Late 1970's
Occupational Training Center	*Metro Recycling Center 666 Pelham, St. Paul	No raw refuse required	None	Separated materials from voluntary sources	Manual separation (handicapped workers)	In operation
	Wood Disposal Facility	None	Wood waste from Twin Cities	Wood waste from Twin Cities	Wood chipping	1975
Phoenix, Inc.	Hoerner-Waldorf along Wabash between Vandalla and Cleveland	1200 tpd	None	City of St. Paul City of Mpls.	Wheelabrator-Frye (metal separation after burn, possibly)	Late 1970's
Poor Richards, Inc.	400 Whitall, St. Paul	21 tpd	None	City of St. Paul	Manual separation of paper & metals	1975 if city and county approval given
Resource Recovery, Inc. (Whiting & Associates)	1 major facility west of Mpls and 1 facility east of St. Paul	All metro municipal waste	Some wood waste	7 county area	Shredding, magnetic separation, compost preparation	At feasibility study stage
Ron Shobe's Transfer Station	North Hennepin Transfer Station Location	Approx 60 tpd	Some wood waste	Comm. firms in Anoka & Henn. Co.	Manual separation	In operation

ABOUT THE CITIZENS LEAGUE . . .

The Citizens League, founded in 1952, is an independent, non-partisan educational organization in the Twin Cities area, with some 3,600 members, specializing in questions of urban planning and development, human services, and governmental structure and finance.

Citizens League reports, which provide assistance to public officials and private groups in finding solutions to complex problems in this metropolitan community, are developed by volunteer research committees, supported by a fulltime professional and clerical staff.

Membership is open to the public. The League's annual budget is financed by annual dues of \$15 (\$25 for family memberships) and contributions from more than 500 businesses, foundations, and other organizations.

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WHAT THE CITIZENS LEAGUE DOES

Study Committees

- 6 major studies are in progress regularly.
- Additional studies will begin soon.
- Each committee works 2½ hours per week, normally for 6-10 months.
- Annually over 250 resource persons make presentations to an average of 25 members per session.
- A fulltime professional staff of 7 provides direct committee assistance.
- An average in excess of 100 persons follow committee hearings with summary minutes prepared by staff.
- Full reports (normally 40-75 pages) are distributed to 1,000-3,000 persons, in addition to 3,000 summaries provided through the CL NEWS.

Citizens League NEWS

- 6 pages; published twice monthly, except once a month in June, July, August and December; mailed to all members.
- Reports activities of the League, meetings, publications, studies in progress, pending appointments.
- Analysis, data and general background information on public affairs issues in the Twin Cities metropolitan area.

Public Affairs

- Members of League study committees have been called on frequently to pursue the work further with governmental or non-governmental agencies.

Community Leadership Breakfasts

- Held from September through June - 7:30-8:30 a.m.
- Minneapolis breakfasts are held each Tuesday at the Grain Exchange Cafeteria.
- St. Paul breakfasts are held on alternate Thursdays at the Pilot House Restaurant in the First National Bank Building.
- Suburban breakfasts are held the last Friday of each month at the Northwest Financial Center Cafeteria, Bloomington.
- An average of 35 persons attend the 64 breakfasts each year.
- The breakfast programs attract good news coverage in the daily press, television and radio.

Question-and-Answer Luncheons

- Feature national or local authorities, who respond to questions from a panel on key public policy issues.
- Each year several Q & A luncheons are held throughout the metropolitan area.

Public Affairs Directory

- A directory is prepared following even-year general elections, and distributed to the membership.

Information Assistance

- The League responds to many requests for information and provides speakers to community groups on topics studied.

Citizens League non-partisan public affairs research and education in the St. Paul-Minneapolis metropolitan area. **84 S. 6th St., Minneapolis, Mn. 55402 (612) 338-0791**

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