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# REPORT
# ON
# SOLID WASTE DISPOSAL IN THE PORTLAND METROPOLITAN AREA

*The Committee:* Dawn M. Dressler, Julie C. Keller, James Kirkham Johns, Clemens J. Laufenberg, Karen J. Moe, David M. Rockwood, Stanley E. Sharp, Alan M. Gaylord, *Chairman.*

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*"To inform its members and the community in public matters and to arouse in them a realization of the obligation of citizenship."*

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To the Board of Governors,
The City Club of Portland:

## I. INTRODUCTION

### A. Committee Assignment

By action of the Board of Governors, April 8, 1974, the Committee was charged "to investigate, analyze, and report on the solid waste disposal problem in the Portland Metropolitan Area and make such specific recommendations for interim and long-range solutions as the committee deems appropriate."

The charge also suggested that the Committee's investigation include:

1. Present landfill areas and garbage dumps now in use and their projected capacity.
2. Projection of future landfill needs.
3. Potential landfill areas remaining (including gravel quarries).
4. Problems connected with using the landfill approach to solid waste disposal (including leakage, ground-water pollution, subsequent settling, and gas generation).
5. Possible other disposal methods: high temperature combustion, garbage sorting, and recycling.
6. Scenic and environmental restrictions and considerations (DEQ requirements and regulations).
7. Existing legislation and legislative proposals implementing recommendations.
8. Special problems of particular waste materials such as tires, nonbiodegradable plastics, auto bodies, and dredge spoils.
9. Land reclamation benefits from landfill activities.

### B. Purpose and Scope

The purpose of this report is to provide information on the current status of solid waste disposal in the Portland metropolitan area and to make recommendations regarding possible alternatives to the present system.

Within the Portland metropolitan area a number of public and private organizations have expended considerable time and money in studies and research in an effort to develop economically viable alternatives to the current practice of "wasting" solid waste materials.

Because the Metropolitan Service District is seriously considering the installation of a multi-million dollar processing-disposal system for the entire Portland metropolitan area, the Committee devoted most of its efforts to becoming informed about the proposed MSD system and attempting to evaluate its impact upon local citizens.

This report also comments upon two other aspects of the solid waste disposal problem:

1. Generation (or creation) of waste, and
2. Collection (and transportation) of waste.

Although long-range considerations are discussed, this report addresses itself primarily to activities which can be implemented within the next five years.

### C. Scope of Research and Bibliography

In the course of its investigation, the Committee, or individual members, interviewed the persons listed in *Appendix A* and reviewed the written materials listed in *Appendix B*. The Committee gratefully acknowledges its debt to the sources referenced.

**D. Committee Membership**

This report, as is typical of City Club reports, has been prepared by a committee of laymen who had no prior personal or professional background with respect to solid waste. Because the conclusions and recommendations presented herein reflect, in part, the subjective opinions of the Committee, basic background information on the Committee is provided as follows:

Dawn M. Dressler ..... Senior Instructor of Physics, Portland State University
Julie C. Keller ..... Consultant, Lobbyist
James Kirkham Johns ..... Attorney, in private practice
Clemens J. Laufenberg ..... Real Estate and Financial Consultant
Karen J. Moe ..... Office Manager, Construction Associates
David M. Rockwood ..... Chief, Water Control Branch, North Pacific Division, U.S. Army Corps of Engineers
Stanley E. Sharp ..... Attorney, in private practice
Alan M. Gaylord (Chrm.) ..... Consulting Structural Engineer

The Committee was assisted, sequentially, by the following City Club research advisors:

John E. Allen ..... Professor Emeritus, Earth Sciences, Portland State University
John L. Frewing ..... Nuclear Engineer, Portland General Electric Co.
Norman Sepenuk ..... Attorney, in private practice

**E. Abbreviations and Definitions**

For purposes of this report the following terms are defined:

MSD—Metropolitan Service District (Portland Metropolitan Area)
CRAG—Columbia Region Association of Governments
DEQ—State of Oregon Department of Environmental Quality
EPA—United States Environmental Protection Agency
COR-MET Report—A three-volume report known as the *Metropolitan Service District Solid Waste Management Action Plan*
Portland Metropolitan Area—The urban-suburban areas of Multnomah, Washington, and Clackamas Counties (the same geographical area is contained within the MSD)
Solid Waste—Useless, unwanted or discarded material.
Residential Waste—Solid waste generated in homes
Commercial Waste—Solid waste generated through business activity, other than manufacturing processes
Industrial Waste—Solid waste generated in manufacturing processes, including construction and demolition
Mixed Waste—Random, unsegregated waste typical of residential and most commercial waste and generally not typical of industrial waste
Putrescible Waste—Organic matter which is decomposed by bacteria and fungi
Demolition Waste—Non-putrescible waste normally produced in the demolition of structures
Landfill (or Dump)—Disposal site for solid waste which does not meet current DEQ requirements
Sanitary Landfill—Disposal site for solid waste operated in such a manner so as to meet current DEQ requirements
Virgin Material—Previously unused material which has been extracted from the environment
Secondary Material—Used material recovered from solid waste, to be used in lieu of virgin material
Reclamation—Process of restoring a waste material to a useful form
Recycling—Reuse of material for the same function

**F. Environmental Regulatory Agencies**

At each level of government regulatory agencies exist which have an interest in solid waste management.

At the federal level the Environmental Protection Agency is one of the principal agencies which formulate goals and administrative regulations regarding the use of the nation's natural resources—especially the natural resources associated with air, water and land, including solid waste management.

The Department of Environmental Quality performs a similar function within the State of Oregon.

Within the Portland metropolitan area, up to the present time, Multnomah, Washington and Clackamas Counties, plus the City of Portland, have provided, to a greater or lesser degree, control over solid waste management within their respective jurisdictions.

In 1970 the electorate established a regional governmental agency, the Metropolitan Service District. MSD is authorized, in conjunction with local governments, to develop and administer regional solid waste management programs.

The Committee has reviewed federal and state regulations as they pertain to solid waste management. However, it did not attempt to evaluate them in this report.

The Committee assumes that regional and local solid waste management programs must meet the goals and satisfy the regulations promulgated by these higher authorities. The State DEQ has an established goal of recycling-reclaiming solid waste material presently going into landfills: 25 percent by 1975 (this year) and 90 percent by 1982.[1] In addition, DEQ has implemented regulations which, according to most of the people interviewed by the Committee, make it economically prohibitive to develop any new sanitary landfill sites within the Portland metropolitan area.

**G. Interim Oral Report**

At the City Club meeting of August 22, 1975 this Committee made a short interim oral report to the membership on the proposed MSD Solid Waste Management Plan. The purpose of the oral report was to obtain the membership's endorsement of the City of Portland's participation in the regional solid waste management plan. The Committee chairman's motion, that "the City Club of Portland support the adoption and implementation of the Metropolitan Service District's 'Solid Waste Management Plan' by the City of Portland," was passed by the membership. According to City Commissioner Connie McCready, who introduced the resolution which would commit the City to the support of the Plan, the testimony by members of the City Club committee was given consideration by the City Council in its decision to support the MSD Solid Waste Management Plan.

## II. REALITIES OF A FINITE WORLD

Portlanders, as well as the rest of the world's population, live in a finite ecological system which has limited material resources.

Many projects on the predicament of mankind have been initiated for the purpose of examining the five basic factors that determine, and therefore ultimately limit, growth on this planet: population, agricultural production, natural resources, industrial production, and pollution. Solid waste has a potential influence upon four of these five factors, the exception being the control of population.[2]

Studies emphasize the fact that all of the above factors, except natural resources, are presently increasing exponentially.[3] Such studies also conclude that many vital resources will be virtually exhausted, or at least inadequate to meet world needs, within 100 years.

A theory adopted by some authorities is that the world must somehow achieve zero population growth. If this goal is not achieved world demand for natural resources will far exceed supply. Universal famine and severe shortages of other necessities for maintaining life could become a reality. What has been casually thrown away in the past may be a vital resource in the future. Our landfills of today could be the mines of tomorrow.

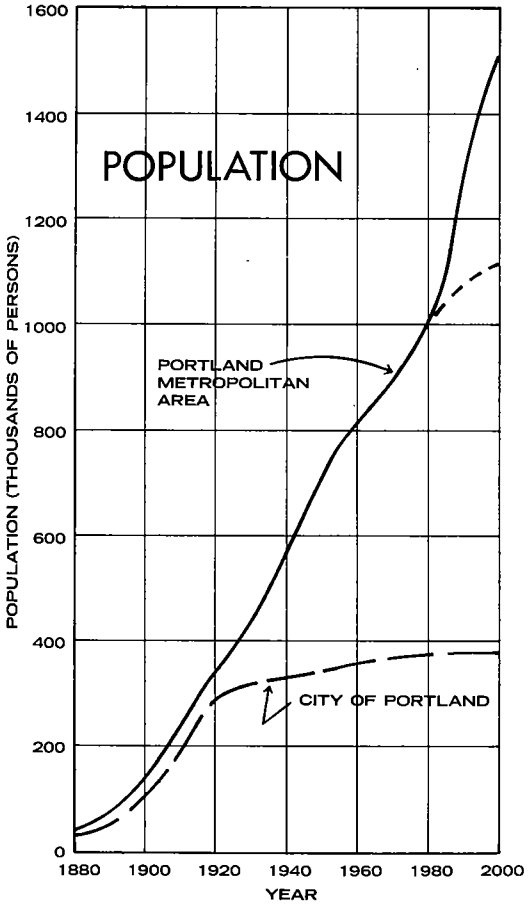



FIGURE #1

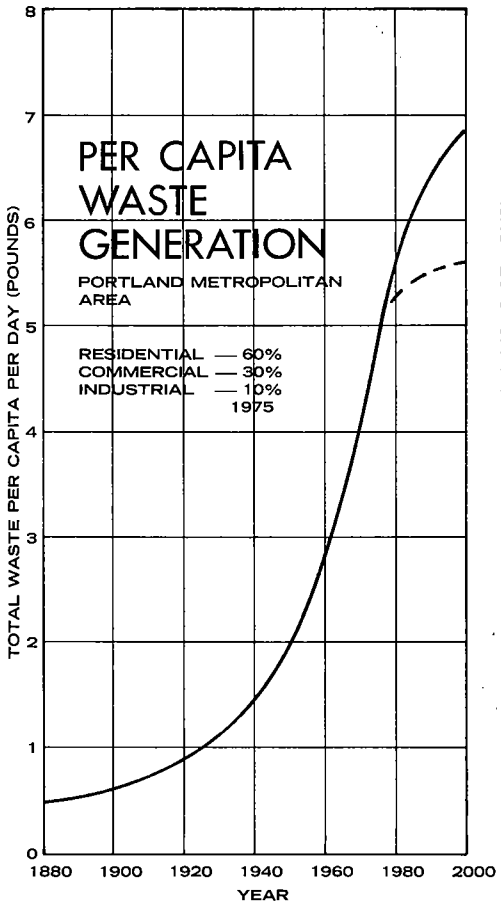



FIGURE #2

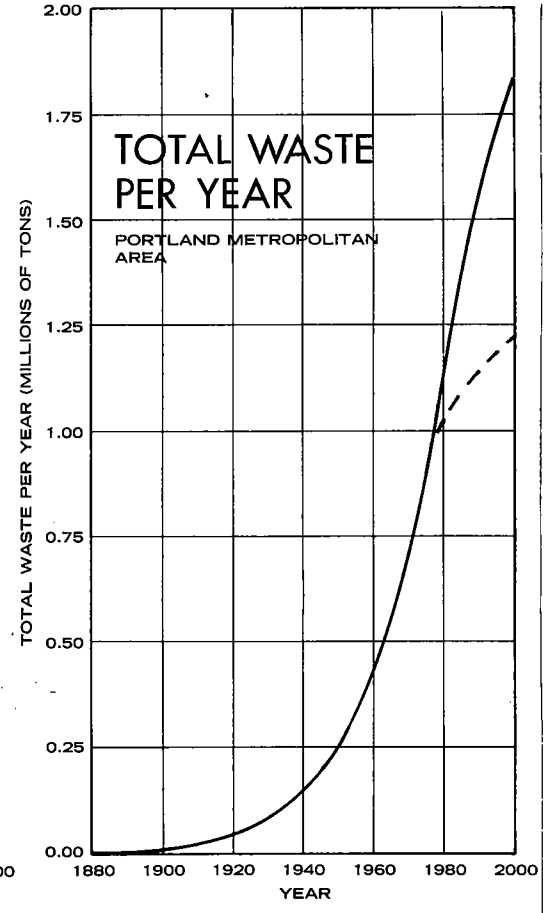



FIGURE #3

What we are calling the energy crisis now is only the beginning of many shortages which could threaten generations to come.

Saving resources is almost synonymous with stopping resource waste. Recycling is the term chosen to describe reuse for the same function; reclamation is used to describe reutilization of the material in new products. However, reclamation is not as efficient as recycling the material because reclamation requires more energy. Therefore, the ultimate goal of solid waste management systems should be to recycle as much material as possible.

*Figures #1, #2, and #3* (developed by the Committee) are included to provide a visual means of expressing the general exponential growth characteristics of the principal factors affecting the generation of waste within the Portland metropolitan area. Quantities shown on the "Total Waste per Year" graph are simply the product of the "Population" and "Per Capita Generation" quantities. The graphs show only general trends. Each figure includes projections to year 2000. The solid lines indicate projections which assume continuation of current trends and the dotted lines indicate projections which assume optimistic reductions in growth rates. Note that it is anticipated that this area will continue to generate an increasing volume of waste through the year 2000. The only question is, "How much more?"

## III. HISTORY OF SOLID WASTE DISPOSAL IN THE PORTLAND AREA

### A. Prior to 1920

Until the twentieth century solid waste consisted primarily of food waste and ashes. Foods and other commodities were generally sold in bulk and carried home from the store in paper containers and the food waste was fed to fowl and domestic animals.

Even then there were solid waste problems, prompting the mayor to report to the City Council in 1880 that garbage, merchandise and debris placed in the streets or sidewalks made necessary an ordinance providing for criminal sanctions. Four years later Portland issued a directive ordering that all refuse ". . . and awful matter . . ." be transported beyond the limits of the city.[4] At that time wastes were not compacted or covered.

Refuse collection was performed by rag men, junk men who collected scrap metals, and farmers who collected food waste which was fed to domestic animals. This evolved into a tradition of garbage collection by family-centered small businesses.

In 1894 the City began the operation of a crematory to dispose of waste and within a few years this process was generally considered successful in disposing of the City's solid wastes. As the amount of garbage increased the City found it necessary to utilize private property for the disposal of ashes from the incineration operation. Later Guilds Lake was designated the City "dump." These cremation-disposal facilities provided an adequate solid waste program through 1920.

### B. 1920 to 1940

Following World War I tin cans and glass bottles came into general use and the composition of household waste changed significantly, with putrescible waste comprising a smaller percentage of the total waste and the percentage of metals and wood fiber, especially paper and cardboard, increasing. This transition signified the end of the farmer as a food waste garbage collector.

By 1923 the annual volume of waste amounted to 27,000 tons, a sevenfold increase from 1910.[5] The City responded by initiating a new procedure—filling gulches and ravines with garbage. Duniway Park was once a ravine which was filled with refuse and then improved.

Although landfills were the primary means of disposing of solid waste after 1920, incinerators continued in operation to handle certain types of waste until 1970 when the City's incinerator on North Swift Boulevard was closed by the Columbia-Willamette Air Pollution Authority because it failed to meet that agency's air emission standards. Through the years improvements were made in the methods used to compact and cover the gar-

bage; however, none of these landfills were operated in the manner now required by the DEQ for sanitary landfills.

### C. 1940 to 1960

Although the volume of solid waste generated within the Portland metropolitan area increased dramatically during this period, from about 100,000 tons per year in 1940 to about 400,000 tons in 1960,[6] the basic methods of disposing of waste material changed little.

During this period it became evident that special provisions were needed to deal with special wastes such as automobile bodies, tires, engine oil, large home appliances, and hazardous chemicals. At the same time paper became the dominant component in the waste stream, resulting in still another innovation—open pit burning.

### D. 1960 to Present

Solid waste management programs now operating in the Portland area are basically refinements of the landfill system started in the 1920's. However, the annual quantity of waste material is now about 200 times that of 1910.

Over the years the landfill system has functioned adequately. However, during the 1960's the people of Oregon recognized significant problems with the system. Problems with air pollution resulted in legislative action banning open-pit burning at landfills and drastically reducing residential and commercial burning. Such legislation has been a factor not only in increasing the volume of solid waste but also in causing the landfills to fill at faster rates. The system could not handle special wastes—more automobile junk yards were being required to store this waste product; tires were found in creeks, rivers, ditches, estuaries, and back yards throughout the state; country roads were becoming littered with used household appliances.

During the 1960's, jurisdiction over solid waste was primarily the concern of two Oregon agencies, the State Board of Health and the State Board of Agriculture. Virtually all research, disposal site investigations, and demonstration projects related to solid waste were performed by these agencies; solid waste research was considered too expensive to be undertaken by local governments.

The federal government, through the EPA, has established national priorities and goals with respect to solid waste management, which included reducing dependency upon landfilling as a means of waste disposal.[7]

The 1969 Oregon legislature established the Environmental Quality Commission (EQC) which meets at least once a month to determine state-wide pollution control policies. The Commission's full-time staff is known as the Department of Environmental Quality (DEQ).

The 1971 legislature assigned EQC the responsibility of adopting rules and regulations establishing a state-wide program and permit system for controlling solid waste disposal. In addition, the legislature authorized EQC to issue a total of $160 million in bonds for pollution control programs throughout the state. Regional and local pollution control agencies can request funding from these bonds—in the form of a maximum 30 percent grant and a 70 percent loan (the loan portion must be repaid).[8]

Federal and state agencies have established goals and regulations, and funding programs have been formed. However, since 1969 up to the present time, Portland has made no significant changes in the traditional methods of managing solid waste, nor has much real progress been made toward meeting federal and state goals.

## IV. PRESENT SOLID WASTE MANAGEMENT SYSTEM

The solid waste management system in use in the Portland metropolitan area is fairly typical of the majority of systems in use throughout the United States. The system basically consists of two operations: collection and disposal.

**A. Systems in Other Cities**

The Committee looked into some of the different kinds of solid waste management systems in use in other metropolitan areas.

New York City disposes of its waste in the Atlantic Ocean. Some waste finds its way back to the mainland and accumulates on the beaches of New Jersey and other states further south.[9]

St. Louis, Missouri incinerates its waste, mixed with coal, to power steam turbines for the generation of electricity. Until May 1973, St. Louis incinerated its entire waste stream. In 1973 an air classification operation was added, making the system similar to that being proposed by the Metropolitan Service District for the Portland area. Now, only the light combustible portion of the waste stream is incinerated; ferrous metals are recovered magnetically and the heavy non-ferrous portion of the waste is landfilled. The St. Louis project is heavily subsidized by the Environmental Protection Agency as a research and development project.[10]

Tacoma, Washington has a solid waste management system similar to that now existing in the Portland area, with the exception that the Tacoma system has been operated as a public utility since 1929 using only city employes.[11]

Seattle, Washington is now deeply involved in proposals for a pyrolysis system which would convert solid waste into either methanol or ammonia. This system, if adopted, would replace the present landfill method of disposal. A system of transfer stations had already been developed in Seattle and will continue to be used in conjunction with this method of energy recovery.[12]

**B. Collection, Disposal, Resource Recovery in Portland**

In the Portland metropolitan area collection is performed principally by approximately 250 small, independent, privately-owned collection companies. The collection companies service residential, commercial and industrial waste generation sources by transporting the wastes to disposal sites.

Two principal disposal sites exist in the Portland metropolitan area—the St. Johns Landfill in north Portland and the Rossman Landfill in Oregon City. These are the only two landfills which accept mixed wastes.

The St. Johns Landfill, started in 1932, is owned and operated by the City of Portland and has a projected remaining life of about five years as established by the City of Portland Planning Commission. Because of a substantial operating deficit at the landfill the City Council, in November 1975, increased disposal rates by 50 percent and voted to investigate the feasibility of private industry operation of the landfill. Private industry is expected to submit bids early in 1976. Until late summer of 1975 the landfill was open 24 hours a day, seven days a week; the landfill is now operated eight and one-half hours a day, six days a week (Monday through Saturday).

The Rossman Landfill, started in 1969, is privately-owned and operated and has a projected remaining life of about ten years. The landfill is open nine hours a day, six days a week and six hours on Sunday. To the Committee's knowledge there are no present problems associated with the management or operation of this sanitary landfill site.

In addition to these two mixed waste landfill sites, the Portland metropolitan area has five sites which accept demolition wastes only. Three are located in Multnomah County and one each is located in Clackamas and Washington Counties.

All seven sites are adequately operated to meet current DEQ regulations.[13] These regulations do not allow any burning at the sanitary landfill sites and they require that all disposed mixed refuse be covered with earth each day. These two regulations have been in effect since about 1970 and are causing the landfill sites to fill at faster rates than previously. It is estimated that under the current rate of filling the landfills have remaining lives of from five to ten years, depending upon the ultimate horizontal and vertical extent of filling. This system, which handles approximately 95 percent of the total waste generated within the Portland metropolitan area, does not provide for the recycling or reclaim-

ing of material. However, some recycling and reclamation of waste is being performed in the Portland area by two different types of organizations.

One type of organization consists of volunteer groups which have formed recycling centers to promote environmental protection and conservation of natural resources. Businesses, formed to recover certain materials found in solid waste, comprise the second type of organization. The recovered materials are sold for profit to available secondary materials markets.

**C. Volume of Solid Waste**

An understanding of the scope of the waste disposal situation requires knowledge of the quantity of material involved. The following tabulation lists the approximate annual tonnage of waste currently being generated within the Portland metropolitan area:[14]

| *Residential* | *Commercial* | *Industrial* | *Total (tons/year)* |
|---|---|---|---|
| 440,000 | 280,000 | 180,000 | 900,000 |

Based upon an estimated average density of compacted waste material of 1,000 pounds per cubic yard in a well-compacted landfill,[15] the volume of material generated in one year would cover one downtown city block to a height of 1,100 feet which is higher than two First National Bank Towers.

On a per capita basis, the 900,000 tons of waste per year is equivalent to one ton per year for each of the approximately 900,000 persons living in the Portland metropolitan area. The amount of waste generated on a per capita per day basis, including commercial and industrial, as well as residential sources of waste is:

| *Residential* | *Commercial* | *Industrial* | *Total (pounds/day/person)* |
|---|---|---|---|
| 2.7 | 1.7 | 1.1 | 5.5 |

The residential portion compares with a national average of 2.55 pounds per day per person.[16]

While it is recognized that there may be some reduction in the per capita generation of waste in future years, the Committee considers it unlikely that any marked reduction will occur within the next five to ten years, and believes that planning of waste management systems should be based upon the above volumes, adjusted for anticipated population increases.

**D. Composition of Solid Waste**

The composition of mixed solid waste generated in the Portland metropolitan area compares with the national averages as follows (percent by weight):[17]

| *Component* | *Portland Area* | *National* |
|---|---|---|
| Paper | 55% | 47% |
| Plastics | 9 | 12 |
| Food waste | 7 | 10 |
| Glass | 5 | 9 |
| Garden waste | 2 | 8 |
| Ferrous metal | 9 | 7 |
| Wood waste | 8 | 2 |
| Textiles | 2 | 2 |
| Non-ferrous metal | 2 | 2 |
| Other | 1 | 1 |
| | 100% | 100% |

Because Portland area percentages are based upon a limited sampling (15 loads made as part of the COR-MET study in March 1973), the Portland area percentages may be closer to the national averages than indicated in the above tabulation. However, the lower

percentage of glass may be attributed to the Oregon Bottle Bill legislation and the higher percentages of paper and wood waste could be attributed to the many paper and wood-oriented industries in the area.

**E. Present System Costs**

The present solid waste management system is financed for the most part by user fees paid by the waste generators. It is basically a self-supporting system. The user fees are paid by the waste generators (homeowners, businesses and industries) to the collection companies. A portion of the fee paid to the collection companies is in turn paid by the collection companies to the operators of the landfill sites as a disposal fee.

The user's costs are distributed between collection and disposal as follows:[18]

| *Customer* | *Collection* | *Disposal* | *Total* |
|---|---|---|---|
| Residential | $34.50/ton | $3.00/ton | $37.50/ton |
| Commercial/Industrial | $16.10/ton | $3.00/ton | $19.10/ton |
| Average | $25.30/ton | $3.00/ton | $28.30/ton |

This data is based upon the consideration that approximately one-half of the total volume of waste is residential in origin. As of October 1975 the average residential collection-disposal fee was $3.25 per month for weekly pickup of an average of 40 pounds of waste.

**F. Favorable Aspects of the Existing System**

The principal advantages of the present system are:

1) No other proven system of solid waste management can be implemented for as low a cost, under present (1975) conditions, as the system now in operation.

2) The system provides for land reclamation through the filling of gravel quarries and other marginal-use lands which then can be used for parks and industrial development.

3) Continuation of the existing system would not disrupt the collection-disposal industry.

**G. Unfavorable Aspects of the Existing System**

The principal disadvantages of the present system are:

1) The system provides no effective means for reclaiming waste material.

2) Landfills, even sanitary landfills, tend to contaminate groundwater supplies through the creation and diffusion of leachate. Leachate is created when water leaches through disposed materials, collecting soluble and insoluble metallic oxides, organic compounds, oils and other impurities. A principal problem with leachate contamination is that its existence does not become apparent, sometimes, until years after a landfill is placed in operation; then it is usually impossible to stop the continuing creation and diffusion of leachate. Even years after a landfill is closed, leachate can continue to cause groundwater pollution.

3) The chemical decomposition of the organic materials placed in landfills results in the creation of methane and similar gases, which are highly flammable. Fires and explosions have been known to occur because of the presence of such gases. Unless extensive preparations are made at the time a landfill is started, it is not possible to control the generation and the movement (diffusion) of these gases.

4) Existing sanitary landfills are being rapidly depleted and the cost to prepare and operate new landfills will be substantially more expensive than existing ones. Landfill regulations recently implemented by the DEQ require extensive site preparations that were formerly not needed. The land acquisition and haul costs for new sanitary landfills in the Portland area would greatly increase collection-disposal costs.

5) Although the problems of litter, odor, vectors (rodents and insects) and ground settlement are being controlled in today's well-operated sanitary landfills, the potential always exists that one or more of these factors could become a problem.

Evidence gathered by this Committee indicates that the technology for adequately protecting the public and the environment against leachate, flammable gases and other problems exists at the present time. It is technically possible, with increases in disposal costs, to eliminate all the physical shortcomings of the present-day sanitary landfills. In addition, there remains a large number of gravel quarries and other marginal-use lands which could, if properly prepared and operated, be converted into sanitary landfills, and the land reclaimed. However, land use planning and public opinion are principal deterrents to establishing new landfill sites.

The present landfill system, however, no matter how carefully operated and managed, remains a system for wasting resources.

## V. METROPOLITAN SERVICE DISTRICT

### A. Purpose of Metropolitan Service District

During the 1969 legislative session, the Oregon legislature adopted the Metropolitan Service District Act (Oregon Revised Statutes, Chapter 268). The purpose of this enactment was to provide metropolitan areas throughout the state with public services not adequately available from existing governmental agencies.

The services that may be provided by a district include metropolitan aspects of sewerage, solid and liquid waste disposal, control of surface water, and public transportation. In addition, services presently provided by other public entities, such as public corporations, cities and counties, may be transferred to a district by agreements between the district and the public entity. Such services thereafter would be provided by the district.

### B. Formation of District Servicing the Portland Metropolitan Area

In 1970 Multnomah, Clackamas and Washington Counties, pursuant to resolutions adopted by their respective governing bodies, called an election for the purpose of determining whether a Metropolitan Service District would be created for the geographical areas encompassing the three counties. By a small majority, the combined electorates of these three counties voted in favor of establishing a MSD. Multnomah County carried the election, even though the voters in Washington and Clackamas Counties opposed the formation of the district. The district boundaries are shown in *Figure 4*.

### C. Governing Body

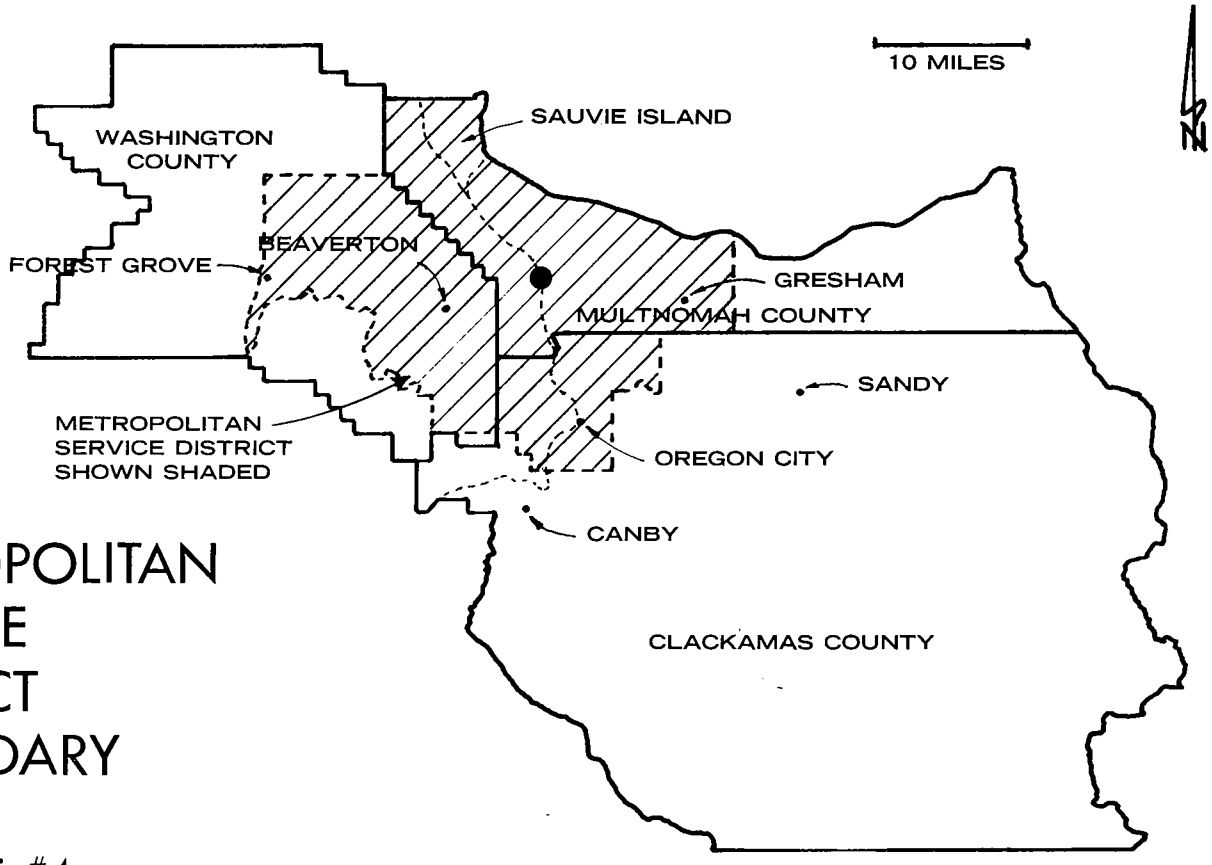
The district is governed by a seven-member board of directors. The board consists of a representative from each of the following governmental entities: the City of Portland; Multnomah, Washington and Clackamas Counties; and collectively, the cities within each of these counties lying within the district. The directors serve a two-year term of office and annually choose a chairman and vice-chairman.

The directors are:

Portland Commissioner Connie McCready
Multnomah County Commissioner Mel Gordon
Washington County Commissioner Ray Miller
Clackamas County Commissioner Robert Schumacher (chairman)
Gresham Councilman Dr. Charles Becker
Hillsboro Mayor Miller Duris (vice-chairman)
Happy Valley Mayor James Robnett

The board is authorized to employ whatever administrative, clerical, technical or other assistance it considers necessary for the proper functioning of the district. In the event the district assumes a function previously performed by an existing public entity, it is obligated to offer employment to persons then employed by such public entity.

At the present time, the district has a staff of six full-time persons (including three engineers) and two part-time persons.




METROPOLITAN SERVICE DISTRICT BOUNDARY

FIGURE #4

**D. Powers of the District**

The district is a municipal corporation and public body of the state, fully capable of exercising public power to the extent necessary to effectuate its purposes and objectives. This power is vested in the governing board.

The district is empowered to acquire, construct, operate and maintain whatever facilities are necessary for the performance of its functions, including the collection, transportation and disposal of liquid and solid wastes. The district may contract with other public or private entities for the performance by such entities of these functions.

By virtue of its enabling legislation, the district has general police powers for purposes of its authorized functions and, accordingly, has the power to promulgate, by a majority vote of the board, whatever ordinances, rules and regulations it considers necessary for the proper functioning of the district.

Testimony given your Committee questions whether the district has the power to regulate and engage in the collection phase of solid waste management. Oregon Revised Statutes § 268.030 entitled "Purpose of chapter; limitation on use; purpose of districts" states in part as follows:

"(3) Subject to the limitations of state law, the district may provide:

"(a) Metropolitan aspects of sewerage, solid, and liquid waste *disposal,* control of surface water, and public transportation; . . ."
(emphasis added)

This section makes no reference to the collection of solid waste, and it would therefore appear that collection is not one of the purposes of the districts. However, ORS § 268.310, entitled "Powers of district," provides in part as follows:

"A district may:

"(2) . . . dispose, and provide facilities for disposal, of solid and liquid wastes and, by agreement with other public corporations, cities, or counties in accordance with this chapter, *collect and transport such wastes.*"
(emphasis added)

The Committee is of the opinion that a district does in fact have power and authority to engage in the collection and transportation of solid waste, once it has resolved the formidable political issues involved.

**E. Finances**

There are several alternative methods of financing available to a district.

A district may, upon voter approval of a tax base in accordance with the Oregon Constitution, levy, on an annual basis, an ad valorem tax on all taxable property within its boundaries, not to exceed one-half of one percent of the true cash value of all such property.

A district is also empowered, again subject to voter approval, to borrow money by the issuance and sale of general obligation and revenue bonds. Once having issued such bonds, a district may, in addition to the ad valorem tax referred to above, assess, levy and collect a special tax upon all taxable property within its boundaries in an amount sufficient to pay the annual interest and any principal indebtedness due or maturing thereon.

In addition to the above, a district may, by adopting a general ordinance and allowing affected taxpayers an opportunity to be heard, levy a special assessment against property within the district in proportion to the benefits such property may receive as a result of the construction or acquisition of a facility or the furnishing of a service, within the district's authority.

Other financing alternatives include the imposition and collection of service or user charges, the solicitation and acceptance of grants of financial and other assistance and the borrowing of money, upon approval of a majority of the board, from any county or city within the geographical boundaries of the district.

In 1970 the voters rejected the MSD tax base levy. To date, the Metropolitan Service

District has been financed primarily by grants from the State of Oregon issued through the DEQ. MSD's 1975-76 budget is $160,000.

**F. Voter Supervision**

In accordance with the laws of the state governing the exercise of the powers of initiative and referendum, the voters of the district may exercise these powers with reference to any of the ordinances, rules and regulations promulgated by the district. The voters may also, in the exercise of the initiative power or by approval of a proposition referred to them by the board, authorize the district to assume additional functions and determine the number, qualifications and manner of selecting board members.

## VI. COR-MET STUDIES AND REPORTS

**A. Background**

In April 1972, DEQ accepted the responsibility of aiding local agencies in solid waste management planning and determined that regional solid waste management plans would be required throughout Oregon. MSD accepted the responsibility for developing a solid waste management plan within its jurisdictional boundaries.

In November 1972, the State Emergency Board authorized the expenditure of approximately $1.1 million for regional solid waste management plans for the State of Oregon. Also in November 1972, MSD enlarged its study area to include all of Multnomah, Washington and Clackamas Counties, plus all of Columbia County. In January 1973, MSD was authorized $325,000 to develop a plan for the Portland metropolitan area.

MSD selected the engineering firms of Cornell, Howland, Hayes & Merryfield, and Metcalf & Eddy, Inc., which formed a joint venture known as COR-MET, for the engineering analyses. The firm of Bartle Wells Associates was selected for the financial and legislative analyses. COR-MET, together with Bartle Wells Associates, made a one-year study and published a three-volume report, entitled *Metropolitan Service District Solid Waste Management Action Plan,* dated April 1974. The three-volume report is commonly referred to as the *COR-MET Report.*

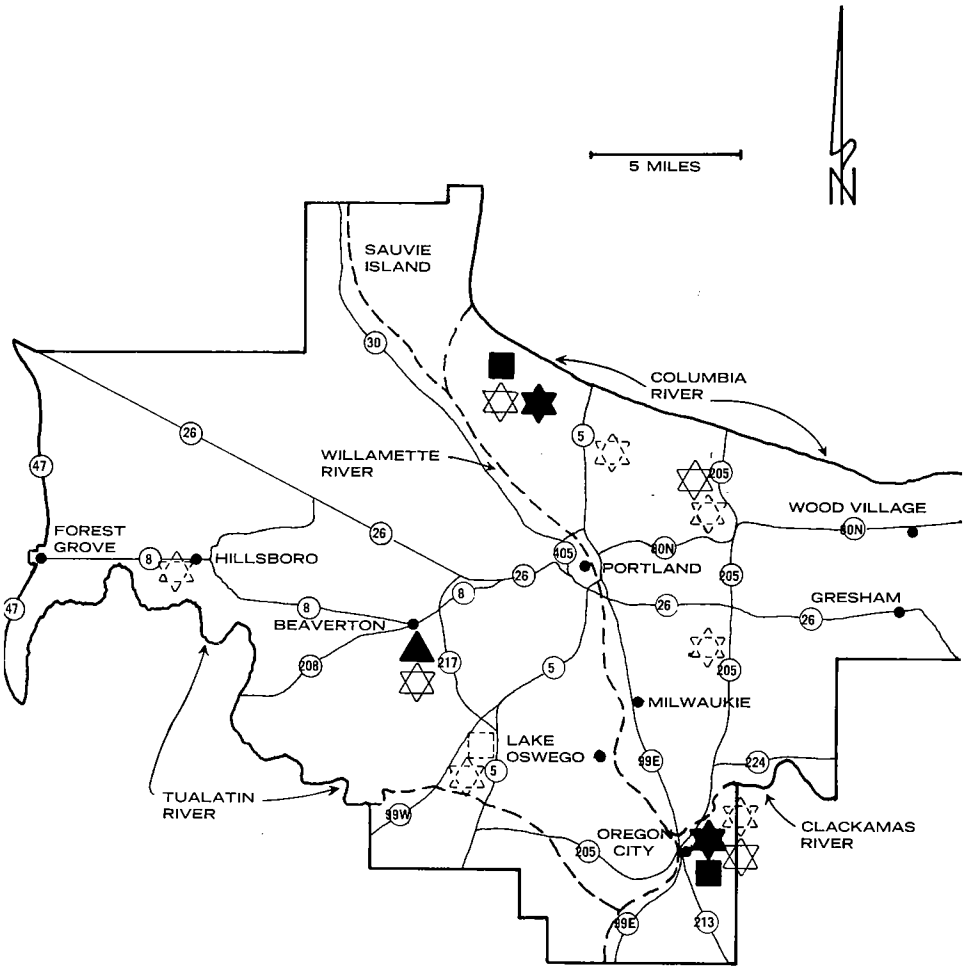
Following the publication of the primary report, COR-MET, in September 1974, published a 150-page Environmental Assessment Report, covering four proposed processing-transfer stations.

**B. Scope and Objectives of COR-MET Studies**

The COR-MET studies concentrated upon the disposal aspects of solid waste management. The collection aspect was considered only to the extent it had an impact upon the processing and disposal of waste.[19]

The COR-MET engineers studied and reported on:

1) The existing solid waste management systems of Multnomah, Washington, Clackamas and Columbia Counties.
2) Population (trends and projections).
3) Waste generation rates and quantities (trends and projections).
4) Composition of mixed wastes.
5) Existing and potential disposal sites, including geology, soil conditions, access, and impact on local neighborhoods.
6) Special wastes, such as: tires, automobiles, appliances, septic tank pumpings, industrial sludges, agricultural wastes, street sweepings, dead animals, logging wastes, pathogenic wastes, hazardous wastes, sewage sludge, waste oil.
7) Costs of existing and various possible alternative systems of waste management.
8) Reclamation and re-use of secondary materials.
9) Secondary markets for: ferrous metals, non-ferrous metals, textile wastes, waste oil, glass, rubber, wood wastes, waste paper.
10) Collection haul costs.
11) Impact of the recommended system upon the environment.




MSD SOLID WASTE PLAN
TRANSFER/PROCESSING STATIONS
AND LANDFILLS
FIGURE #5

Bartle Wells Associates studied and reported on:

1) The legislative framework which presently exists relative to solid waste management.
2) Options available for financing the recommended system.

The published reports by COR-MET and Bartle Wells Associates consist of approximately 1100 pages, including some 300 tables and diagrams. Much of the factual data contained in this City Club report originated in these documents.

### C. The COR-MET Recommended System

The COR-MET recommended system was based upon the premise that the people of the Portland metropolitan area desire a system which will provide for reclamation and re-use of secondary materials from waste. In addition, the COR-MET engineers recognized that the prime responsibility of any solid waste system is to provide for the safe, reliable, and economic removal of solid wastes at all times and under all conditions. Therefore, the system recommended would be capable of reclaiming whatever types and quantities of waste the secondary materials markets could economically support and at the same time would be able to dispose of the full quantity of waste for which there was no market.

The COR-MET Report made no specific recommendations affecting collection and transportation (except for destination). No changes would be required in the existing collection industry for the recommended system to be implemented.

Direct dumping of raw waste into landfill sites would no longer be allowed; raw wastes would be taken only to transfer-processing stations. The COR-MET Report initially recommended six transfer-processing stations and three sanitary landfill sites, to be located approximately as shown on *Figure #5*. However, prior to publication of the Report and after review and comments by the public, COR-MET modified their initial recommendation to reduce the number of processing stations to four (also shown on *Figure 5*).

Filled collection vehicles with wastes from residential, commercial, and industrial customers would discharge their waste at the nearest transfer-processing station.

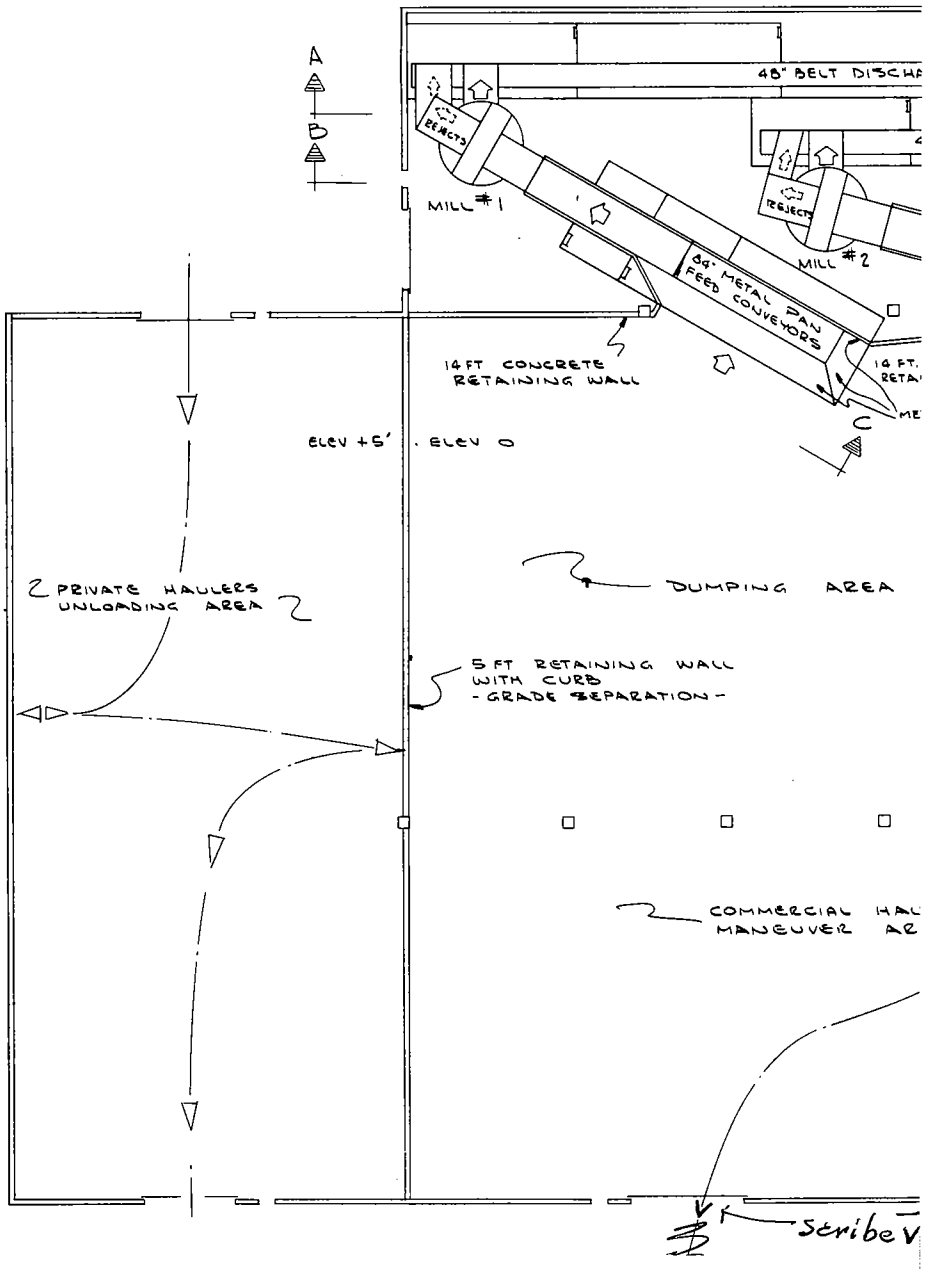
*Figure #6* schematically shows the general layout of a transfer-processing station. The collection vehicles would discharge their waste onto the dumping floor and small loaders would push the waste onto conveyor belts. Hand-picking stations would be located along the conveyors so that corrugated carboard and large bulk paper items could be removed from the waste stream and recycled. The waste would be fed into grinding mills, which would reduce the material to a homogeneous mass of small pieces. The waste would then pass through magnetic separators to reclaim the ferrous metals for sale as scrap steel. The waste would then enter a pneumatic separator (air classifier) which would blow and separate the light combustibles material for collection and sale as fuel. The remaining waste would be compacted and conveyed by large vehicles to a nearby sanitary landfill.

COR-MET estimated that about 65 percent (by weight) of the waste would be removed as light combustibles and six percent as ferrous metals, leaving about 29 percent to be landfilled.[20] Because of the relatively high volume/weight ratio of the light combustibles, only about 10 percent of the original *volume* of waste would require landfilling. In addition, because of the non-organic nature of the residue requiring landfilling, substantially less cover material (earth) would be required to provide for proper operation of the landfills, and the lives of the landfills would be substantially extended.

## VII. THE PROPOSED MSD SOLID WASTE MANAGEMENT PLAN

### A. Development of the Present Plan

Following publication of the COR-MET Report, MSD began moving toward implementation of the recommended system of four transfer-processing stations.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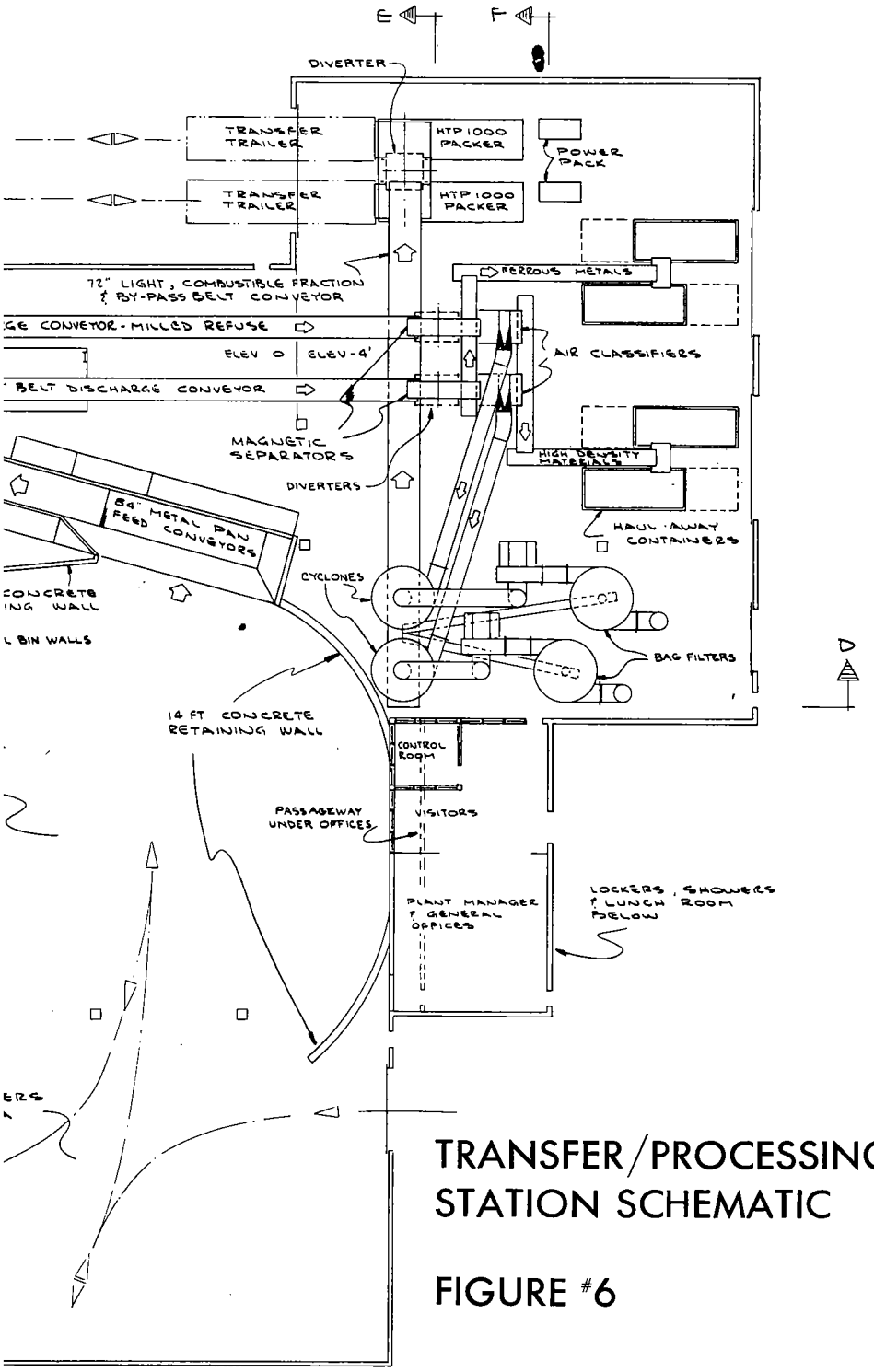


TRANSFER/PROCESSING STATION SCHEMATIC

FIGURE #6

Immediately, it became evident that COR-MET's estimate of $16 million for capitalization of the Plan was to low. MSD arranged for COR-MET to develop a revised estimate. The revised estimate indicated that the total capitalization for the four transfer-processing station system would be about $38 million.

With this information MSD prepared a "Request for Proposal" (RFP)[21] dated November 25, 1974, wherein MSD solicited proposals from private companies to construct four transfer-processing facilities and to supply and operate the solid waste processing equipment.

The bid opening date was scheduled for February 3, 1975, giving the prospective bidders slightly more than two months to prepare their proposals.

As structured under the RFP, MSD would select and purchase the land on which to locate the transfer-processing stations and contract with the successful contractor-operator for the design of the permanent building structures. As the owner of the land and proposed buildings, MSD would advertise for bids for the construction of the permanent facilities on a competitive bid basis. The contractor-operator would have the responsibility for the design, installation and financing of the processing equipment. Its ownership would remain with the contractor-operator, who would be completely responsible for the operation, maintenance and replacement of the processing equipment.

Because of fluctuation in the amount of waste, the RFP called for a price per ton bid for the first 10,000 tons of waste processed each week. Payment for these 10,000 tons was guaranteed to the contractor-operator even if the actual tonnage was less. The RFP also requested a bid to process waste over the guaranteed tonnage.

The RFP also called for a division of revenue from the sale of secondary materials with a bid percentage going to the contractor-operator and the balance going to MSD. The bid was structured in this manner to provide the contractor-operator with a financial incentive to market the secondary materials.

Three firms (Continental Resources Recovery Company, Inc., a subsidiary of Continental Can Company, Inc.; Vista Chemical & Fiber Products, Inc., a subsidiary of the Seagrave Corporation; and Parker-Northwest Construction Company) responded to the Request for Proposal. A public committee appointed by the MSD Board spent six months evaluating the proposals and at the same time requested a $20 million grant-loan from the State of Oregon Pollution Control Bond Fund. The state legislature denied this request, which materially contributed to the rejection of all three proposals by MSD.

A group of private garbage collection companies doing business in northwestern Oregon formed a corporation called Consolidated Waste Services, Inc. (CWSI). CWSI representatives stated they also wanted to submit proposals, but that the two-month bidding period was too short a time for CWSI to develop a responsive proposal.[22] Subsequently, CWSI representatives persuaded others to look critically at the proposed MSD Solid Waste Management Plan. Although the CWSI representatives say that the MSD Plan is a good long-range solution for handling solid waste in the Portland area, they also say that MSD should not implement the Plan at the present time.

Due to the grant denial and the influence of CWSI and other interested groups, in August 1975, MSD further reduced the scope of the Plan (see *Figure #5*) to provide for:

1) One transfer-processing station to be located in north Portland, near the St. Johns landfill;
2) One transfer-processing station to be located in close proximity to the Rossman landfill; and
3) One transfer (only) station to be located in Washington County near Beaverton.

At the present time no plan or time schedule exists for developing additional transfer-processing stations.

**B. Description of the Proposed MSD Plan**

As stated above, the latest MSD Plan consists of two transfer-processing stations and one transfer (only) station.

All residential, commercial and industrial mixed waste will be transported to the three stations, utilizing the services of the existing collection industry.

The two transfer-processing stations will function as originally recommended by COR-MET as shown schematically in *Figure #6*. Corrugated cardboard and other bulk paper will be recovered by hand, light combustibles will be recovered pneumatically, and ferrous metals will be recovered magnetically. The recovery processes will remove about 71 percent of the total waste (which will be sold as secondary materials). The remaining 29 percent will be landfilled at the two existing sanitary landfill sites.

Waste delivered to the Washington County transfer (only) will be transferred and compacted into large transport vehicles for delivery to one of the processing stations. Thus, all metropolitan waste will be processed by the two processing facilities.

All three facilities are scheduled to be in operation by late 1979, with construction starting on the first transfer-processing station in 1976.[23]

**C. Ownership and Operation**

MSD's latest Plan retains the concept of public (MSD) ownership of land and buildings and private ownership and operation of processing equipment.

MSD is currently negotiating with potential contractor-operators for implementation of the Plan. Among the firms being considered is Parker Northwest Construction Company (one of the three firms which responded to the Request for Proposal and the owner-operator of the Rossman landfill). In addition, CWSI and Resource Recovery Byproducts, Inc. have prepared unsolicited proposals for operation of specific facilities.

The Committee has reviewed arguments for public ownership, partial public ownership and total private ownership of the system and is of the opinion that the proposed MSD Plan incorporates many of the advantages of both the public and private sectors of the economy. MSD as the public agency must answer to its citizens. MSD can obtain low-cost loans and receive tax-generated revenues (Pollution Control Bond funds). The private contractor-operator(s) is able to realize profits from efficiencies in operation, innovations in marketing, and development of higher-use secondary materials.

**D. Financing**

Based upon information contained in the three responses to the "Request for Proposal" received by MSD in February 1975, the reduced scope of the Plan, and revised engineering estimates, MSD is projecting that the latest Plan will require $17.8 million in initial capital.[24] MSD expects to obtain this capital from two sources:

1) The State of Oregon Pollution Control Bond Fund; and
2) private investment.

MSD itself does not intend to levy taxes or sell bonds in order to finance the Plan.[25]

Approximately $8 million in private investment will be made by the successful contractor-operator(s) to provide the processing equipment. The remaining $9.8 million, for land acquisition, site development, and buildings, will be obtained in the form of a 30 percent ($2.9 million) grant and a 70 percent ($6.9 million) loan from the State Pollution Control Bond Fund. Thus, the Plan would receive a one-time public subsidy of $2.9 million. The $6.9 million loan would be repaid through revenues generated by user fees and sale of secondary materials.[26]

This financing arrangement must be approved by the State. MSD is expected to request the Pollution Control Bond monies, through the State Emergency Board, in February 1976.

**E. Cost Analysis**

The following tabulations have been developed by your Committee based upon information provided by a number of sources, including the MSD staff, Consolidated Waste Services, Inc., and Parker Northwest Construction Company.

The annual cost of the system (for the year 1980) including repayment of the 70 percent loan, is projected as shown below. COR-MET's estimate of 900,000 tons of waste

per year was revised to 800,000 tons per year for the purpose of these calculations in light of MSD data on waste volume.

| | |
|---|---|
| 1) Amortization of $6.9 million loan over a 17-year period with an interest rate of 4.7% (Source of funds: State Pollution Control Bonds sold in 1972) | $ 600,000 |
| 2) Processing cost (800,000 tons @ $10/ton) | $8,000,000 |
| 3) Landfill cost (800,000 tons x 29% x $2.90/ton) | $ 660,000 |
| 4) Administration | $ 320,000 |
| Total Annual Cost (1980) | $9,580,000 |

The annual revenue from the system (for the year 1980) is projected as follows:

| | |
|---|---|
| 1) Sale of cardboard and bulk paper (2% of 800,000 tons @ $15/ton) | $ 240,000 |
| 2) Sale of ferrous metals (6% of 800,000 tons @ $40/ton) | $1,920,000 |
| 3) Sale of light combustibles, as energy source) (63% of 800,000 tons @ $3.00/ton) | $1,512,000 |
| 4) User fees, paid by the public as part of collection (800,000 tons @ $7.39/ton) | $5,910,000 |
| Total Annual Revenue (1980) | $9,580,000 |

The user fee is computed to balance the revenue with the cost.

All of the estimates used to develop this tabulation are of questionable accuracy, especially the following:

1) The 800,000 ton-per-year quantity of waste;
2) the $10 per ton processing costs;
3) the market value of $3.00 per ton for light combustibles; and
4) the market value of $40 per ton for ferrous metals.

This Committee has received a wide range of data projected for the year 1980. The volume of waste ranged from 700,000 to 1 million tons per year; processing-disposal costs ranged from $7.50 to $12.50 per ton; the light combustible market ranged from zero to $5.00 per ton; and the ferrous metals market ranged from $40 to $60 per ton.

Each variation in projected data, assuming other factors constant, results in different projected user fees to balance the MSD budget. Assuming the above variations in data, the MSD Plan's projected 1980 processing-disposal costs would range from $2.25 to $15.25 per ton.

In order to place the above range of disposal costs in perspective, the cost of disposal must be considered with respect to the overall cost of collection-disposal. Under the present system the residential customer paid approximately $3.25 per month in October 1975.[27] If the MSD Plan had been fully implemented at that time, the $2.25 to $15.25 per ton disposal costs would have resulted in monthly residential collection-disposal rates ranging from $3.20 to $4.15 per month for one can per week pickup.

The relatively small effect that disposal cost has on overall collection-disposal rates is due to the fact that approximately 10 percent of the total cost is for disposal; the remaining 90 percent reflects collection costs. For commercial and industrial customers using drop boxes and other relatively efficient collection modes, overall projected 1980 collection-disposal costs would range from $18.35 per ton to $31.35 per ton.

**F. Energy Considerations**

Because a surplus of energy no longer exists it is important that any new waste disposal system be subjected to a thorough analysis of its energy utilization and energy recovery.

The major source of energy recovery within the proposed MSD system is the reclamation of the light combustibles portion of solid waste. Light combustibles, which comprise 65 percent of the waste stream, consist of paper, plastic, light-weight fibrous mate-

rials and organic materials which are air-separated from the waste stream after grinding. This material is combustible and can be burned as a low-grade fuel in industrial applications. Its principal use is in replacing conventional fuels in mixtures with wood wastes or low-grade coals in hog-fuel boilers or electrical generating plants.

PRICES OF ALTERNATIVE FUELS

| | *Price/Unit* | *Million BTU's per Unit* | *Price per Million BTU* |
|---|---|---|---|
| Light Combustible Fuel (Wastes) | $3.00/ton* | 10 | $0.30 |
| Hog Fuel (Wood wastes) | 7.00/ton* | 19 | 0.37 |
| Natural Gas | .06/therm | 0.1 | 0.60 |
| Rye Grass Straw | 10.00/ton | 16 | 0.63 |
| Coal—Low Grade | 15.00/ton | 24 | 0.63 |
| Coal—High Grade | 20.00/ton | 24 | 0.83 |
| Fuel Oil | 17.00/bbl | 8.25 | 2.06 |
| Gasoline | .50/gal | 0.13 | 3.85 |

Source: COR-MET

*Transportation costs are important considerations, particularly in the price of light combustibles and hog fuel.

As energy costs continue to rise the value of light combustibles as a fuel is expected to increase.

Additional energy savings are achieved through the recovery of ferrous metals. The energy savings in this area are derived from the elimination of mining, refining and production processes required to create new ferrous metal. Economies in transportation also contribute to the net energy savings of the system.

A net energy analysis of the proposed MSD Plan is summarized below:

ENERGY SAVINGS PER TON OF WASTE[28]

| | *BTU Savings per ton of waste* |
|---|---|
| *Materials Recovery* | |
| Corrugated cardboard | 270,000 |
| Ferrous metals | 1,190,000 |
| Light Combustibles | 6,500,000 |
| *Transportation Economies* | 70,000 |
| *Landfill Site Operation* | 60,000 |
| LESS: *Energy used* in separation and processing | (−) 300,000 |
| Net Energy Savings per ton of waste | 7,790,000 BTU |

In processing 800,000 tons of waste each year, annual energy savings will amount to $6.23 \times 10^{12}$ (6.23 trillion) BTU.

**G. Reliability of Processing Equipment**

A number of persons interviewed[29] by the Committee expressed concern about the reliability of the processing equipment.

Large, powerful, rugged shredding equipment is required to mill the waste into small pieces about 2½ inches in maximum dimension for pneumatic and magnetic separation. Such equipment now on the market is first generation; all the "bugs" may not have been worked out of the equipment. Replacement and maintenance costs may be much higher than anticipated.

The MSD Solid Waste Management Plan may remove most of the risk from the public (MSD) and place the risk on the private contractor-operator; the contractor-operator is required to design, purchase, operate, maintain, and replace the operating

equipment. The risk that the public (MSD) assumes with the operating equipment is that the contractor-operator, if he becomes insolvent, would leave MSD with the responsibility for replacing the contractor-operator with another firm, with a possible increase in cost to the public.

### H. Other Resource Recovery Activities

This report has already noted that a small amount of resource reclamation is presently being performed by volunteer organizations and private industry within the Portland metropolitan area.

The Committee is concerned about how such activities fit into the MSD Solid Waste Management Plan. The risk is that the MSD Plan will become locked into an economic need to maintain energy recovery operations at the expense of materials recovery. For example, the recovery of paper products for their fiber content is superior to reclaiming the paper for use as fuel. On the one hand, the MSD staff[30] states that the Plan will not infringe upon recycling-reclamation activities which are performed outside the solid waste collection-disposal system. On the other hand, the staff states that the MSD Plan, in order to be economically viable, must process all waste material generated within the Portland metropolitan area.

Recycling-reclamation activities, which can be operated in such a way that the materials do not become classified as waste, can pre-salvage material before it becomes a part of the waste stream.

If all collection companies servicing the general public within the MSD system were franchised, MSD could then define any materials collected by the franchised companies as waste and require that such waste material be conveyed to MSD transfer-processing stations. Materials salvaged by non-franchised companies, through direct arrangement with homeowners, businesses and industry, could then be processed by private recycling-reclamation organiaztions.

Because the MSD Solid Waste Management Plan is primarily designed to handle mixed waste, certain types of special wastes such as automobile bodies, tires, hazardous chemicals, and so forth, will have to continue to be handled outside the transfer-processing system.

Although disposal of such special wastes is not discussed in this report, the disposal of these kinds of waste materials is included within the scope of MSD's responsibilities.[31] MSD, at the present time, has a tire processing system which includes the requirement that all tires classified as waste must be processed through the MSD system. The process simply "chews up" tires and the residue either is landfilled or sold on the secondary materials market as fuel.

## VIII. COLLECTION INDUSTRY IN PORTLAND

As previously noted, the collection-hauling aspect of solid waste management comprises approximately 90 percent of the total cost of the existing collection-disposal system to residential customers and would comprise about 80 percent of the total cost of the proposed MSD Solid Waste Management Plan.

Although hundreds of thousands of dollars have recently been spent at taxpayer expense in the study of solid waste, there remains virtually no adequate analysis of the collection phase. The Committee was not specifically directed to address this aspect of solid waste management; therefore, it devoted only a small portion of its overall effort to the collection phase.

### A. Organization of Collection Industry

Within the Portland metropolitan area the collection industry has consisted of approximately 250 relatively small, private collection companies, many of them family-owned and operated. For almost 50 years routes in Portland have been well established and basically unchanged. The 1955 City Club report[32] on garbage explains in detail the

political ramifications regarding garbage routes in the City. Virtually nothing has changed in 20 years.

The nature of the industry in Portland is beginning to change with the recent arrival of SCA Services, a large national company, and the merger of several smaller local companies to form Metropolitan Disposal Company (MDC). Both entities, primarily commercial haulers, compete with each other. Once dominated by family-owned operations, the Portland industry is now a mix of these and larger, more impersonal companies.

Teamsters Local #220, Sanitary Drivers, has played a prominent role in the local industry. The Union, composed of some 400 members, both owners and drivers, represents about 98 percent of the local industry.[33] As of October 1, 1975, Local #220 merged with Local #281 to form a combined Teamsters Local Cab, Laundry and Sanitary Drivers Union in order to enhance financial benefits, increase membership and strengthen bargaining power.

The collection industry is highly organized with at least nine associations having influence in the Portland area: Teamsters Local #281 Cab, Laundry and Sanitary Drivers; Portland Association of Sanitary Service Operators; Oregon Drop Box Association; Multnomah County Refuse Association; Washington County Refuse Association; Clackamas County Refuse Association; Tri County Solid Waste Management Council, Oregon Sanitary Service Institute; and, the National Solid Waste Management Association. Rather than being indicative of factionalization, the Committee believes these organizations provide a number of forums by which the industry may express its views.

Recent industry developments, including recycling trends and proposals such as MSD's, have caused much concern within the collection industry. A few years ago several industry activists joined together to form the Tri County Solid Waste Management Council. They hired an attorney for the purpose of seeking ways for the industry to own and operate transfer-processing stations and actively pursue franchising. In July 1974, they set up a corporation, Consolidated Waste Services, Inc. (CWSI) with industry owners and collectors as stockholders. As discussed earlier, CWSI has been seeking alternatives to financing and operating a transfer-processing system and its persistent lobbying efforts have been influential in reducing the scope of the original MSD Plan.

**B. Franchising and Licensing**

Control of disposal is essentially a function of state DEQ, Division of State Lands, Coast Guard and Corps of Engineers regulations, and enforcement takes place at dumping sites by operators, with periodic inspections by DEQ officials. The City of Portland uses licensing and dumping fees as a means for controlling the use of the St. Johns Landfill, as well as a means for raising revenue to pay for the landfill operation.

Control of collection in the Portland metropolitan area is unique. Washington and Clackamas Counties have utilized franchising as a means of control for a number of years. Multnomah County and the City of Portland have not, but both currently are debating the merits of franchising and considering its implementation.

Franchising can be defined as an

> "agreement between a regulatory body and a service providing body; in solid waste collection, a city or county (or other regulatory agency) grants a monopoly to an operator to provide collection services at a regulated charge to the customers in a defined territory. In return, the operator not only pays a percentage of his gross annual income to the regulatory body, but opens his books to governmental scrutiny, and in some cases, agrees to condemnation of his property if he fails to perform the service."[34]

Multnomah County and the City of Portland have no direct control over collection practices. Committee studies indicate that routes have been characterized by overlap and broken, fragmented, zig-zag patterns, and the Committee assumes that Portland area collection costs reflect this inefficient routing. Teamsters Local #220 has traditionally defined territories, set collection rate guidelines and delegated public relations responsibilities. The League of Women Voters in their 1972 Study on Solid Waste,[35] concluded that

Portland has utilized an "unorthodox franchise system" by unofficially delegating policing and mediation powers to the Union. The Committee believes that although the system has worked satisfactorily in the past, leaving this authority solely with Union representatives does not necessarily guarantee that the public interest will be adequately represented.

The formation of splinter groups within the industry such as CWSI, combined with the forthcoming retirement of Union Executive Secretary Nick Brajavich, longtime spokesman for Local #220, and the merger with Local #281, may signal the end of an era of union control. These factors, plus a developing community awareness and concern for energy conservation, continually rising costs, and the potential implementation of the MSD Solid Waste Management Plan, lead the Committee to conclude that the need exists for firmer governmental control over the collection industry. The Committee is hopeful these many factors will serve as a stimulus for the City of Portland and Multnomah County to seek a viable means of control through franchising.

The Committee feels that on the whole our citizens are satisfied with the service they receive from private collectors. Complaints and problems are infrequent and have been handled promptly; therefore the Committee sees no reason for the existing privately-owned collection industry to come under public ownership.

However, the Committee believes that government and private industry, through franchising, can work together to stabilize collection costs. This would include creation of more efficient routes, defined territories and the establishment of a rate schedule reflecting a customer's preferences for pick-up. Franchising could also provide the base for the potential integration of the industry in Portland and Multnomah County with the MSD Plan.

## IX. ALTERNATIVES TO MSD PLAN

A number of alternative solid waste management systems are outlined below and compared with the proposed MSD Plan. All of the alternatives have certain advantages over the collection-disposal system now in operation in the Portland area. The option to continue the existing collection-disposal system is not discussed here because it has already been described.

COR-MET engineers considered in depth four solid waste management alternatives, one of which was modified and is described as the proposed MSD Plan. The remaining three are described below in paragraphs **A** through **C.** COR-MET also considered four other alternatives described in paragraphs **D** through **G.** In addition, your Committee examined alternatives described in paragraphs **H** through **L.**

### A. Transfer Stations and Landfills

This method would add to the existing collection-disposal system conveniently located solid waste transfer stations throughout the area. Waste would be hauled to either a transfer station or directly to a landfill. At the stations waste would be transferred to large compactor vechicles for hauling to the landfills.

The advantage of the foregoing is a reduction of cost below the present system by reducing the haul distance for the collectors. The disadvantages are: the life of the landfill is not extended; there is no resource recovery; and the leachate and methane gas problems would not be resolved.

### B. Transfer Stations, Baling and Landfills

This method is similar to **A** above with certain modifications. All wastes would be delivered to the transfer stations; cardboard separation would take place for reclamation at the transfer stations; and the remaining waste would be high compression-baled for transfer to landfills.

The advantages of **B** are: a lower cost than the proposed MSD Plan; handling of wastes at the landfill would be easier; increased efficiency of operations at the landfill would be achieved by eliminating public access; there would be a reduction of odor, litter and vectors at the landfill; and landfill life would be extended somewhat.

The disadvantages of this plan are: a projected cost higher than that described in paragraph **A**; no provision for extensive resource recovery, except for cardboard, slight extension of landfill life; and no reduction of leachate and methane gas generation.

**C. Transfer Stations and Incineration**

This method provides for the collection of all wastes at transfer stations; transfer of waste to a central location for incineration and steam generation to provide heat; recovery of ferrous metals from incinerator residue; and the placement of the remaining residue in a landfill.

The advantages are: reduction of landfill requirements to five percent of the existing system as opposed to the proposed MSD Plan which would reduce landfill requirements to 10 percent; elimination of leachate, odors, litter, vectors and probably methane gas production at the landfill site; and this method would not require milling or air classification equipment.

The disadvantages are: the plan requires very high capital outlay; it provides very little flexibility for modification in the future; and it could create air pollution problems.

**D. Barging to Boardman**

This alternative would provide that shredded waste be hauled by barge to Boardman, Oregon for soil enrichment of land used for agricultural purposes. The Committee concluded this proposal was simply not feasible. (A modification of this method would be to haul the shredded material to an electrical power generation facility in Boardman where the shredded material would be added to coal for power generation. Shredded material, also known as light combustibles due to its considerable BTU content, has definite market value and combined with coal will result in conservation of coal resources. The present data relating to this proposal is insufficient for adequate Committee analysis.)

**E. Rail Haul to Centralia**

The Committee, concurring with the COR-MET Report, rejected this proposal as uneconomical. Seattle, Washington evaluated a similar proposal for disposal of its wastes at Centralia and reached the same conclusion.

**F. Barging of Baled Waste (As Opposed to Trucking Baled Waste)**

The use of barges was rejected as being uneconomical. In fact this method is even more expensive than the process described in paragraph **B** above.

**G. Hydropulping**

With this method water is added to the light combustibles to produce a homogeneous fluid mixture of water and waste. The end product would be used in the manufacture of roofing felt. However, supply would vastly exceed contemplated demand, and the Committee deemed this alternative impractical. A market might develop for hydropulped material to be used in highway landscaping to replace sawdust which is presently used; however, the system is quite inflexible.

**H. Pyrolysis**

This method would employ the use of high temperatures to achieve the chemical conversion of solid waste materials into ammonia or methanol by means of a catalytic process.[36] This proposal is technically feasible and incorporates some processes being used by the petrochemical industry. This process is compatible with the proposed MSD Plan.

**I. Composting**

With this system the organic portion of solid waste is decomposed into basic organic compounds to be used for agricultural land enrichment.[37] Composting may in time become an economically competitive alternative to energy generation and would also be compatible with the MSD Plan; the only change would be to sell the light combustibles to the soil enrichment market rather than to the energy market.

**J. Land Development**

Solid waste has a potential use for landfill operations such as highway construction. California was able to save approximately $1 million in highway embankment construction by mixing 200,000 cubic yards of waste with an equal amount of conventional fill material on a road building project.[38] This use, however, does not provide a long-term dependable means of disposal; and landfills are not an acceptable method for recovering resources.

**K. Deep Ocean Dumping**

The feasibility of deep ocean dumping has yet to be determined. It would require compacting, baling, encasing in water-penetrable plastic, and barging the waste to sea for dumping at depths greater than 7,500 feet.[39] The method provides no means for resource recycling and reclamation, nor for land reclamation.

**L. Ore-Plan**

The Ore-Plan is a systems approach to home separation and recycling which has been developed locally and has stimulated a good deal of interest. It requires that residential wastes be separated *in the home* into various classifications: ferrous metals, aluminum, plastics, newspapers, other waste paper, food wastes, leaves and yard wastes, glass (separated by color), and miscellaneous wastes.[40] The concept has considerable merit; however, it has yet to be proven an effective recycling tool. The Committee has been informed that test operations in the Portland area have run into some difficulty meeting State DEQ and City/County Health Department requirements and subsequently have been denied a DEQ license to continue operation.[41]

## X. LONG-RANGE CONSIDERATIONS

The Oregon Bottle Bill, recently enacted and generally nationally acclaimed, illustrates closed loop recycling within the marketing-consumer realm. Prior to 1973 and enactment of this legislation, about 50 percent of the soft drink containers and only 30 percent of the beer containers were refillable. Within six months after this legislation was passed 99 percent of both soft drink and beer containers in Oregon were refillable glass.[42]

Because approximately 33 percent of the total quantity of waste consists of containers and packaging materials, closed loop recycling, if fully implemented would, alone, reduce wasted material by one-third.

One hundred percent recycling can never be accomplished because some things wear out and must be replaced. Clothing, for example, wears out and although the remaining material may be reclaimed to manufacture new clothing or other products, it cannot be directly recycled as clothing.

**A. Government Regulations**

MSD, as a regional governmental body, has a significant influence upon solid waste management in the Portland area and the Committee hopes that MSD will have a positive impact upon resource recovery. The ultimate goal (which some Committee members believe is not attainable) would be a solid waste system completely self-supporting, requiring no public subsidy in any form. Just how well MSD and private industry will interact remains to be seen, but the Committee does believe MSD can and will significantly improve solid waste management.

State laws and regulations have significant effects upon the Portland metropolitan area solid waste management program. In fact, the state laws and regulations which created and funded the DEQ are directly responsible for MSD's ability to develop the proposed MSD Plan. To date, except for incidental assistance provided by CRAG, the State has completely funded the MSD activities; no local taxes or other monies have been provided to MSD.

**B. Voluntary Industrial Activities**

Voluntary actions by private industry will have a significant impact upon the future of recycling and reclamation.

The economic law of supply and demand will provide an ever-increasing natural incentive for profit-oriented private industry to make use of recycled and reclaimed materials, especially as costs of obtaining virgin materials increase in the years ahead. This factor, as much as any other, convinces this Committee that adequate markets for the solid waste secondary materials will exist in the years to come.

True recycling, as opposed to reclamation, obviously cannot be generally implemented without first introducing major economic and social changes. Certainly, recycling and reclamation cannot be accomplished on a large scale unless the general population is fully informed of the need and dedicated to its accomplishment.

## XI. CONCLUSIONS

1. The Portland metropolitan area will run out of existing sanitary landfill facilities for receiving mixed solid waste within the next five to ten years, if current quantities of material require disposal and if DEQ continues its present sanitary landfill regulations.

2. The present programs of reclamation-recycling have had small effect upon the present overall solid waste program. The principal benefit of these activities has been creation of an awareness among a portion of the citizenry of the potential for reclamation-recycling and of the problems inherent in unstable secondary markets.

3. The proposed MSD program is the most economically feasible alternative to the present method of handling the disposal of solid waste in the Portland metropolitan area. The MSD program has the potential, depending upon an adequate development of secondary markets, of being self-supporting, with a modest increase in current consumer costs. In addition, the program is capable of accommodating future changes in separation technologies and secondary markets.

4. The two principal disadvantages of the MSD program relate to: 1) The large amount of capital required to implement the program and difficulties related to obtaining adequate low-cost financing; and, 2) the unstable nature of potential secondary markets for processed (reclaimed) solid waste materials.

5. MSD's plan to utilize a combination of low-cost public financing (Pollution Control Bonds) and private investment capital is a reasonable and adequate means of financing the program.

6. It is imperative that the MSD Plan be implemented as a joint venture between the public (MSD) and private industry.

7. Markets do in fact exist for the sale of most of the material now being wasted even though the selling prices for these materials are highly unstable. However, because the processing equipment proposed for use in the MSD program is capable of producing reclaimed material for sale to a wide range of markets, it is expected that, over the years, the MSD program can accommodate itself adequately to the changing and unstable secondary materials markets.

8. Until the general public becomes more fully informed regarding the generation, collection, processing and disposal of solid waste, progress in solid waste management will be slow.

9. The only truly long-range solution to the solid waste disposal problem rests with the ability of each individual citizen to drastically reduce the generation of waste. Complete (100%) reclamation-recycling may not be technically or economically feasible and there will always be need for sanitary landfill facilities. The goal must be to minimize the amount of material which must be landfilled.

10. If the MSD program is to be implemented, it is mandatory that the City of Portland and all in-lying suburban areas participate in the program and that MSD be given sole responsibility for all aspects of solid waste *disposal* within the district.

11. The major cost for the residential consumer lies in the area of collection—as opposed to processing-disposal. At present, approximately 90 percent of the consumer's cost is for collection-transportation, with only 10 percent for disposal. Therefore, a major increase in the cost of disposal will have a relatively minor effect upon the total residential

consumer cost. (For example, doubling the cost of processing-disposal will increase the residential consumer's cost only about 10 percent.)

12. Home separation and classification of solid waste materials, for the vast majority of the population, is not presently feasible without economic incentives or enforcement legislation.

13. For the present, recycling and disposal of special wastes such as tires, sewage sludge, toxic chemicals and radioactive wastes can be best treated independently of the general mixed wastes to be processed by the proposed MSD system.

## XII. RECOMMENDATIONS

1. The MSD transfer-processing station program should be financed and adopted for implementation throughout the Portland metropolitan area with MSD as the sole public agency regulating the processing and disposal of solid wastes within the district.

2. The MSD Plan, consisting of two transfer-processing stations and one transfer (only) station, should be expanded to include additional transfer (only) stations wherever and whenever their existence will result in reduced customer collection-disposal costs. Similarly, additional transfer-processing stations should be constructed only as they can be economically justified.

3. The present St. Johns and Rossman sanitary landfills should continue to be used and their lives extended as much as ecologically and economically possible. However, plans for the development of replacement sanitary landfill sites should be made by MSD in the near future.

4. MSD should own the buildings and land for the transfer-processing stations and the landfills. Private industry should own and operate the processing equipment for the stations and the landfills, under franchise to MSD. Both MSD and private industry should participate in profits from the sale of secondary materials.

5. The MSD program should be self-supporting, with each waste generator paying his fair share. General tax funds should not be utilized to subsidize the program.

6. Collection of residential and commercial solid waste should continue to be performed by private industry under governmental regulation.

7. MSD and the collection industry should review the collection phase of the existing, and any proposed, solid waste management system for the purpose of determining whether improvements and efficiencies in the collection phase can be implemented.

8. MSD should establish regulations and policies actively promoting the highest use of materials currently being classified as solid waste. MSD should not interfere with efforts of private industry or organizations to reclaim or recycle materials which are not collected as mixed waste.

9. As a long-range solution to the solid waste problem, citizens should use and industry should produce products and services which minimize waste.

10. Citizens should encourage additional federal, state and local legislation which promotes use of secondary materials, rather than virgin materials.

Respectfully submitted,

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3. A French riddle for children serves to illustrate exponential growth. "Suppose you own a pond on which a water lily is growing. The lily plant doubles in size each day. If the lily were allowed to grow unchecked, it would completely cover the pond in 30 days, choking off the other forms of life in the water. For a long time the lily plant seems small, and so you decide not to worry about cutting it back until it covers half the pond. On what day will that be? On the twenty-ninth day, of course. You have one day to save your pond." (Meadows, *The Limits to Growth*, 37.)

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27. Interview, Charles C. Kemper.

28. COR-MET, *Environmental Assessment*, 117.

29. Interviews: Ezra Koch; Richard Glanz, Owner, Metropolitan Disposal Corporation; Lee D. Kell, Attorney, Kell, Alterman, Runstein & Thomas; Homer Spencer, Consulting Engineer.

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## APPENDIX A—PERSONS INTERVIEWED

(Titles listed are as of the time interviewed.)

*Alexander, Harold,* President, Resource Recovery Byproducts, Inc.

*Brajavich, Nick,* Secretary-Treasurer, Teamsters Local #220, Sanitary Drivers.

*Bronow, John,* Department of Public Works, City of Tacoma, Washington.

*Corssmit, C. W.,* Economist, Cornell, Howland, Hayes, Merryfield/Hill, Inc.

*Culham, William B.,* Director, Solid Waste Management, City of Portland.

*Duncan, Richard C.,* Assistant Professor, Systems Science, Portland State University.

*Glanz, George,* Owner, Metropolitan Disposal Corporation.

*Glanz, Richard,* Owner, Metropolitan Disposal Corporation.

*Gordon, Mel,* Commissioner, Multnomah County, and member, Board of Directors, Metropolitan Service District.

*Kell, Lee D.,* Attorney, Kell, Alterman, Runstein & Thomas.

*Kemper, Charles C.,* Program Manager, Metropolitan Service District.

*Kennedy, Michael D.,* Project Engineer, Cornell, Howland, Hayes, Merryfield/Hill, Inc.

*Knapp, H. John,* Secretary, Resource Recovery Byproducts, Inc.

*Koch, Ezra,* President, Consolidated Waste Services, Inc.

*Larson, W. J.,* Chief, Refuse Utility Division, City of Tacoma.

*McCready, Connie,* Commissioner, City of Portland, and member, Board of Directors, Metropolitan Service District.

*Parker, Jack,* Vice President, Parker-Northwest Construction Company.

*Roberts, Richard,* Attorney, Rankin, Walsh, Ragen & Roberts.

*Schmidt, Ernest,* Administrator of Solid Waste Management, Department of Environmental Quality, State of Oregon.

*Spencer, Homer,* Consulting Engineer.

*Spies, Kenneth H.,* Assistant Director, Land Development Program, Department of Environmental Quality, State of Oregon.

*Stevens, Rodney D.,* Treasurer, Zidell Explorations, Inc.

*Stout, Gary,* Director of Planning and Development, City of Portland.

*Swenson, Jim,* Assistant to Commissioner Connie McCready, City of Portland.

*Wilson, David,* General Manager, Northwest Region, Continental Can Company, Inc.

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