UPDATE TO THE
SOLID WASTE MANAGEMENT PLAN

for

OAKLAND COUNTY, MICHIGAN

ADOPTED BY THE BOARD OF COMMISSIONERS

ON JUNE 28, 1990

Daniel T. Murphy, County Executive

PRINTED ON RECYCLED PAPER

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ACRONYMS, ABBREVIATIONS
DEFINITION OF TERMS

Act 641	Act No. 641 of the Public Acts of 1978, as amended, being 299.401 et. seq. of the Michigan Compiled Laws and known as the Solid Waste Management Act (refer to Appendix E).
Board	Oakland County Board of Commissioners
Commingled	Source separated recyclable material that is combined in a single container.
Composting	The natural decomposition of organic matter, such as leaves, grass clippings, garden waste and small brush, into humus.
Construction/ Demolition Waste	Largely composed of concrete, asphalt, wood, metal, and plaster.
County	The County of Oakland
County Executive	The County Executive of Oakland County, Michigan
CRC	County Review Committee: established to review development proposals for solid waste management facilities during the interim periods between Plan Updates.
Department	Oakland County Department of Solid Waste Management
GM	General Motors Corporation
IGA	Intergovernmental Agreement
Industrial Special Wastes	Nonhazardous wastes which, due to their size and composition, require special handling and/or disposal procedures. Examples include fly ash, foundry sand, and sludges.
lb.	pound
Leachate	Liquid formed at landfills when water passes through deposited waste.
MCU	Modular combustion units: a prefabricated variation of the mass burn incineration technology.

ACRONYMS, ABBREVIATIONS
DEFINITION OF TERMS

MDNR	The Michigan Department of Natural Resources.
Mixed Waste	Municipal Solid Waste.
MSWB	Municipal Solid Waste Board.
Municipal Solid Waste	Waste typically collected from residences, commercial establishments and industrial housekeeping operations.
Municipality	A township, city, or village.
NEPA	National Environmental Policy Act.
OCDPW	Oakland County Department of Public Works.
PCD	Pounds per capita per day.
PED	Pounds per employee per day.
Plan	Update to the November 1981 Solid Waste Management Plan for Oakland County, in accordance with Act 641.
RCRA	Resource Conservation and Recovery Act.
RDF	Refuse derived fuel.
RRRASOC	Resource Recovery and Recycling Authority of Southwest Oakland County formerly Southwest Oakland County Solid Waste Consortium.
SEMCOG	Southeast Michigan Council of Governments.
Site Separated Material	Glass, wood, metal, paper products, plastics, rubber, textiles, yard clippings, or any other material that is separated at a processing facility for the purpose of conversion into raw materials or new products.
SOCRRA	The Southeastern Oakland County Resource Recovery Authority, formerly named SOCIA - the Southeastern Oakland County Incineration Authority.
Source Separated Material	Glass, wood, metal, paper products, plastics rubber, textiles, yard clippings, or any other material that is separated at the source of generation for the purpose of conversion into raw materials or new products.

ACRONYMS, ABBREVIATIONS
DEFINITION OF TERMS

SWPC	Act 641 Solid Waste Planning Committee.
Tons/day	tons per day. When working with uncompacted municipal solid waste, it is assumed that there is one ton per three cubic yards of refuse. When working with construction/demolition wastes or industrial special waste, it is assumed that there is one ton of waste per cubic yard. When working with in-place refuse in a landfill, it is assumed that there is one ton per two cubic yards.
tpd	tons per day.
Type II	Material that includes general types of solid waste including, but not limited to, garbage and rubbish and industrial special waste. Hazardous wastes are excluded.
Type III	Material that has a minimal potential for groundwater contamination.
U.S. EPA	United States Environmental Protection Agency.
Wte	Waste-to-energy: Combustion of solid waste with energy recovery.
Yard Waste	Fallen leaves, cut grass or other organic debris that can be converted to humus.

1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

The County began implementing an economically responsible and environmentally sound County-wide solid waste management system following approval of the Act 641 Plan for the County (November 1981) by MDNR in July 1983. In accordance with Act 641 (refer to Appendix E), the County Board has initiated actions to update the first plan, including the formulation of updated goals and objectives. This document, the plan update (the Plan), is submitted in accordance with Part 7 of Act 641 Rules.

The primary goal of the Plan is to establish an integrated waste management system for the disposal of all non-hazardous solid waste produced by residential, commercial, and industrial waste generators in the County. The management system will achieve optimal environmental protection by maximizing waste reduction and reuse, composting and recycling, and minimizing the need for combustion and sanitary landfilling.

Eight objectives have been established by the SWPC for the Plan:

1. Develop an administrative and technical framework to provide a complete solid waste management program for the County, including a long term policy goal for the County not to become a net importer of waste.

2. Identify the quantity and types of waste generated by residential, commercial, and industrial units in the County.

3. Coordinate solid waste management planning and implementation with the local municipalities.

4. Develop the methods, procedures, financial support, and time schedules for implementation of the Plan.

5. Reduce the volume to be landfilled through waste reduction and reuse, composting, recycling, and/or waste-to-energy.

6. Eliminate to the greatest extent possible pollution resulting from solid waste and maintain a high quality environment, preventing adverse effects on public health and the environment resulting from improper solid waste collection, transportation, processing or

disposal, including the protection of groundwater and surface water quality, air quality and land quality.

7. Establish a program for source reduction, reuse, composting and source separation/recycling of no less than 30 percent of the municipal solid waste stream by 1995. The ultimate goal for reduction, reuse, and recycling/composting is 50 percent of the municipal solid waste stream by the year 2005.

8. Conserve fossil fuels by having energy recovery associated with incineration.

1.2 DATABASE

1.2.1 WASTE GENERATION

To plan adequately for solid waste management, it is necessary first to determine the amount and characteristics of the waste generated in the County. This information will help determine which waste management options are best for the County and the specific design requirements for proposed facilities and programs.

Based on available data sources, the following waste generation rates were estimated for the County's waste streams:

- Residential: 2.9 pounds per person per day
- Commercial: 5.75 pounds per employee per day
- Industrial: 10.61 pounds per employee per day
- Construction/Demolition: 0.7 pounds per person per day
- Industrial Special Wastes: 412,000 tons per year in 1990, escalating according to manufacturing employment growth (does not include wastes from site remediation)

Using these generation rates, current (1990) waste generation for the County was estimated to be nearly 1.9 million tons per year.

Future population and employment projections (SEMCOG) were used to estimate waste generation for 1990 - 2010. Based on this demographic information, total waste generation in the County was estimated to be nearly 2.3 million tons per year in 2010.

1.2.2 WASTE COLLECTION AND DISPOSAL FACILITIES

Telephone surveys and questionnaires were used to define the County's current collection and disposal system.

Presently, all municipalities but two (Madison Heights and Pontiac) use private haulers to collect waste.

Two transfer stations exist: one owned and operated by Laidlaw in Southfield and one owned and operated by SOCRRA in Troy. Additionally, numerous drop-off centers are located throughout the County for the collection of recyclable materials, and General Motors is operating a shred/burn facility in the City of Pontiac.

As of June 1990 the County has six permitted and operating sanitary landfills:

- Collier Road Sanitary Landfill
- Eagle Valley Sanitary Landfill
- Lyon Land Development Sanitary Landfill
- Southeastern Oakland County Resource Recovery Authority (SOCRRA) Sanitary Landfill
- Waterford Hills Sanitary Landfill
- Wayne Disposal -- Oakland Sanitary Landfill

Permitted sanitary landfill space within the landfills is extremely limited. Half of the operating landfills have a remaining life of under three years (as of March 1988). The total remaining life for operating landfills is 6.2 years (or until mid-1994 at current filling rates). However, these landfills will not be able to handle the County's waste for

the entire 6.2 year period. As some landfills close, remaining operating landfills will not be able to accept all of the diverted wastes.

1.2.3 IMPORT AND EXPORT

Currently a free flow of waste exists across County borders. Approximately 20 - 30 percent of the material going to landfills within the County is generated outside of the County. Oakland County is sending waste to the following out-of-County landfills:

- Sexton Landfill (Lapeer County)
- Arbor Hills Landfill (Washtenaw County)
- Genesee Landfill (Genesee County)
- Montrose Landfill (Genesee County)
- Grand Blanc Landfill (Genesee County)
- Wayne Disposal -- Belleville (Wayne County)
- Pine Tree Acres (Macomb County)
- Laidlaw (Lenawee County)

Based on available information, it appears that the County is net importing 394,200 cubic yards per year (540 tons per day) of residential, commercial, and industrial waste and exporting 360,700 cubic yards per year (990 tons per day) of construction/demolition and industrial special waste.[1] Since landfill capacity is based on volume and not tonnage, the County is importing and exporting approximately equal volumes of waste.

These import/export figures do not include SOCRRA's waste which has been directed to private sector landfills in and out of the County since closure of the SOCRRA incinerator in 1988.

1/ The conversion factor for in-place landfilled solid waste is 2 cubic yards/ton; for construction/demolition and industrial special waste it is 1 cubic yard/ton.

1.3 AVAILABLE WASTE REDUCTION/DISPOSAL TECHNOLOGIES

In developing the selected Plan, the County has reviewed all available technologies including:

- o Waste reduction
- o Reuse
- o Source separation
- o Recycling
- o Composting
- o Chipping
- o Transfer stations
- o Mass burn systems (with energy recovery)
- o Refuse derived fuel (RDF) systems (with energy recovery)
- o Incineration without energy recovery
- o Land disposal
- o Baling
- o Shredding

The County evaluated the environmental, technical and economic advantages and disadvantages of each of these technologies and developed a system that integrates waste reduction, reuse, composting (including chipping), source separation, recycling, waste-to-energy (using mass burn), and landfilling, with the possible inclusion of transfer stations.

1.4 DEVELOPMENT OF SELECTED SOLID WASTE MANAGEMENT ALTERNATIVE

The County has established the twin policy goals for solid waste disposal of maximum reliance on waste reduction, reuse, composting and recycling and minimum utilization of landfilling and waste-to-energy. Consistent with this policy decision, the County has designed a system and is implementing a program that is environmentally sound, cost-effective, and meets the needs of all its residents.

The County's role in the context of the Plan will be that of provider of the recycling, composting, waste-to-energy, and landfill facilities plus facilitator/coordinator, educator, and administrator of the unified system in concert with local municipalities and private enterprise. Responsibility for implementation of the Plan has been assumed by the County through its Board and County Executive. To execute this responsibility, a Department of Solid Waste Management will be established through recently enacted legislation. Specific responsibilities will also be required of the individual municipalities. Municipalities that sign the Intergovernmental Agreements with the County to dispose of waste in the system facilities will be required to institute mandatory recycling ordinances requiring source separation by residential, commercial and industrial generators (or alternatively requiring that materials be separated at an approved mixed-waste processing facility), and waste flow control ordinances requiring haulers to bring recyclables and waste to designated facilities. Recyclables and compostables may be delivered to a facility designated by the municipality. Communities will also authorize the County to take an active role in ordinance enforcement. Finally, the County will institute a household hazardous waste collection program.

A Solid Waste Board, comprised of representatives of the participating municipalities, will meet at least yearly to provide a forum for consideration of matters pertaining to the acquisition, operation and management of the system. Its Executive Committee will meet at least monthly to advise, consult with and make recommendations to the Department of Solid Waste Management.

1.4.1 WASTE REDUCTION/REUSE

Education

The County will sponsor a public education program embracing all system components, emphasizing waste reduction, reuse, composting, source separation, and recycling.

Legislation

The County will support legislation encouraging waste reduction and reuse.

Reduction of Waste Stream

The County will study various programs to promote reuse and to reduce the amount of materials entering the waste stream, such as reuse centers, waste exchanges, and waste assessments for private businesses and municipalities upon request to identify methods for reducing waste created.

1.4.2 RECYCLING PROGRAM/COMPOSTING PROGRAM

County Role

The County as administrator of the solid waste management system is implementing County-level programs and is committed to coordinating and, to the extent practicable, monitoring recycling services provided by the public and private sectors.

Material Recovery Facilities and Source Separation Programs

Implementation of the recycling program is based on an unlimited number of non-County owned recycling facilities and up to two County-owned recycling facilities. Each such County-owned facility will be capable of processing up to 400 tons of recyclable materials per day operating initially on five-day week/one shift per day basis. The County system shall initiate steps to coordinate and cooperate with the recycling efforts at the local government level and at the private sector level.

Each County-owned facility initially will accept materials separated to some degree as opposed to accepting mixed waste. At the initiation of system services, to facilitate public participation, the communities, at a minimum, will mandate separation of waste into recyclables and nonrecyclables with delivery of the mixed recyclables to a recycling

facility. Thus, the communities may, at their option, mandate higher degrees of separation. The types and amounts of materials delivered and recovered may vary from plant to plant due to regional variations in the composition of the waste stream. Storage of certain recyclables during downturns in the market will be available through storage facilities upon designated land. None of the recyclables will be combusted or landfilled until all market possibilities have been exhausted and only with guidance from the Executive Committee of the Solid Waste Board concerning all alternative environmentally safe handling procedures.

Composting Program

The County will establish a system of composting facilities available to the entire County for disposal of leaves, brush, yard waste and lake weeds. The actual amount of materials to be composted will determine the number and sizes of such facilities.

Procurement of Goods Made From Recycled Materials

The County will promulgate guidelines to encourage procurement of materials made from recycled goods. It will support State and Federal laws mandating such procurement.

Fee Structure

To encourage maximum participation by the residents in the recycling and composting programs, the County will study the design of an incentive rate structure. For example, the County could offer a price differential for loads of more highly separated materials.

Recycling of Construction/Demolition Debris

The County will encourage recycling of demolition debris to the extent practicable.

Landfill Needs

For the short-term (not to exceed 10 years), sufficient private and public sector landfill capacity will be contracted to satisfy bonding requirements for system start-up. For the long-term (10 to 20 years), County-owned sites will be sought as part of a landfill system that does not exceed 20 years of capacity. Sites that provide the least possible transportation and traffic impacts will be sought. A time frame for implementation is an estimate because the rate at which the original contracted capacity will be used will depend on the ability of the system member municipalities to meet volume reduction goals adopted herein. County landfill sites will help supplement the entire disposal capacity for the County to meet the overall goal of 20 years of capacity for the Plan.

1.4.3 HAULING/TRANSPORTATION

The County will not alter the existing system for collecting and hauling solid waste. However, the Intergovernmental Agreement will require municipalities to direct their departmental haulers and, as a license condition, that private haulers collect all waste, including source separated recyclables left at the curbside or at a drop-off center for pick-up, and deliver such waste to a designated facility.

1.4.4 INTER-COUNTY WASTE FLOW

The Plan will allow counties designated in this Plan to utilize disposal facilities within the County provided they have a system that meets the waste reduction and recycling goals established by the County and the County does not in the long-term become a net importer of solid waste. Further, the Plan authorizes the County to utilize landfills and other waste disposal facilities in those counties specifically designated in this Plan. Reciprocal arrangements with adjacent counties can be made only after the adjacent county demonstrates that it has the capacity and the ability to reciprocate within its borders. Further, the disposal of Livingston County waste in the County is explicitly authorized only if a

mutually satisfactory agreement is entered into within one year of the MDNR approval of this Plan.

This Plan includes by reference all exceptions and restrictions set by other County plans on the types of waste that will be allowed into the County for disposal.

All the system components may be used to dispose of waste from those counties specifically designated in this Plan so long as such disposal does not adversely affect the processing of County waste.

1.4.5 HOUSEHOLD HAZARDOUS WASTE COLLECTION

The County will institute a drop-off or collection program for household hazardous waste through a temporary mobile collection center. The frequency of collection has not been established. The County will work with the Cooperative Extension Service to design public education programs and share data on the incidence of household hazardous waste. Additionally, local municipalities will be encouraged to institute household hazardous waste collection programs to supplement the County's.

1.4.6 INDUSTRIAL SPECIAL WASTE

Industrial special waste generators will continue to dispose of their waste through the private sector. It is estimated that approximately 421,000 tons of this waste will be produced in 1995 and 449,000 tons in 2010. The County will acquire additional landfill sites for industrial special X waste in the event that neighboring counties close their borders to waste generated outside their jurisdictions.

1.4.7 TRANSFER STATIONS

The County will continuously evaluate the location of system facilities (recycling, composting, and waste-to-energy facilities and landfills), flow control considerations, the available transfer technology, the quantity of waste to be hauled, and the costs of hauling as well as

capitalization and operation of transfer stations to determine the need for the inclusion of such facilities within the system.

1.4.8 VOLUME REDUCTION THROUGH COMBUSTION WITH ENERGY RECOVERY

By mid-1993, two waste-to-energy facilities are expected to be operating. One is the County facility to be built by Westinghouse, which will be 2000 tons per day[2] nameplate capacity.

The other is the rehabilitated incinerator owned by SOCRRA; or if SOCRRA requests, another County facility. Factors indicating the need for additional capacity are: (1) number of tons committed by municipalities; (2) quantity of residue from the recycling and composting facilities; (3) seasonal variations in the volume of the waste stream; and (4) economics.

Effectiveness of the integrated system shall be reviewed during a five year evaluation period subsequent to the system becoming operational, and include an analysis of the need, if any, for an additional waste-to-energy facility.

Local municipalities will control the flow of waste through hauler licensing. The County will enforce flow control, with municipalities processing licensing revocations. All communities contracting for the waste-to-energy facility must also participate in the County's recycling and composting programs. The County recycling and composting programs will include participation by non-County owned facilities. Thus, the communities will have the choice of delivery to a County-owned or non-County owned facility.

2/ 2000 tons per day is the nameplate capacity assuming a Btu value of 5200 Btus per pound; the actual amount processed or the "throughput capacity" is 85% or 1700 tons per day. The waste processed through a waste-to-energy facility will not include materials such as batteries and tires that could generate toxic emissions or ash.

The County has the responsibility for hauling and disposal of the ash residue from its waste-to-energy facility. This ash will be disposed of in segregated, specially designed (monofill) cells designed to hazardous waste landfill facility standards (Act 64). Such disposal will exceed current Federal and State requirements for ash disposal.

1.4.9 LANDFILLING

The County will be responsible for providing environmentally safe landfill(s) to accept residue generated by the County's facilities, including waste-to-energy ash and bypass, nonprocessible waste, or recycling and composting bypass. In the short-term (not to exceed 10 years), the County will contract with private and public landfills to provide capacity to meet system bonding requirements. Additional County-owned landfills will be added to the system to supplement initial facilities (not to exceed 20 years of capacity) and will be sited in accordance with the interim siting procedures outlined in this Plan.

The integrated solid waste management system discussed in this Plan provides for a comprehensive waste disposal solution, including addressing the pending exhaustion of existing landfill capacity, as the facts are currently known. A timeframe for implementation of long-term County landfill facilities is an estimate because the rate at which the contracted capacity will be used will depend on the ability of the system municipalities to meet volume reduction goals set herein. In that regard, within five years of the integrated system becoming operational, the efficiency of all system components will be reassessed to guarantee the continued viability of the waste management solution. As the need for more capacity is indicated, new facilities will be sited in accordance with the provisions of Section 8.5.

1.4.10 IMPLEMENTATION LEGISLATION

The County sponsored legislation to implement and finance the system herein discussed. Briefly, it authorizes the Board to establish the Department of Solid Waste to administer a solid waste system, and

authorizes the Board to pledge the full faith and credit of the County to the payment of any bonds issued for the system.

1.4.11 SITE SELECTION

The County will follow a policy of equitable allocation in siting facilities within the County. No Municipality which has an operating, designated landfill or landfills, as described in this Plan, will be considered as the recipient of an additional landfill site during the life of the Plan notwithstanding legal action which may force the County to impose an additional site onto a Municipality as the result of a court directive, provided other qualified sites are available in other municipalities in the County. Sanitary landfills may not be expanded beyond those descriptions or acreage as designated in the Plan for the life of the Plan unless the Municipality by action of its governing body specifically authorizes the expansion or expansions and the Plan is amended accordingly. Any Municipality having one or more designated sanitary landfill sites in the Plan may opt for additional sanitary landfill sites at any time in the future upon concurrence of its governing body and amendment of the Plan.

Sites have been selected for the County waste-to-energy facility and recycling facility in Auburn Hills (refer to Section 8.2). The goal is to identify suitable site(s) for composting of materials no later than the 1990 season. Figure 1.4-1 illustrates the locations of Act 641 facilities designated in this Plan.

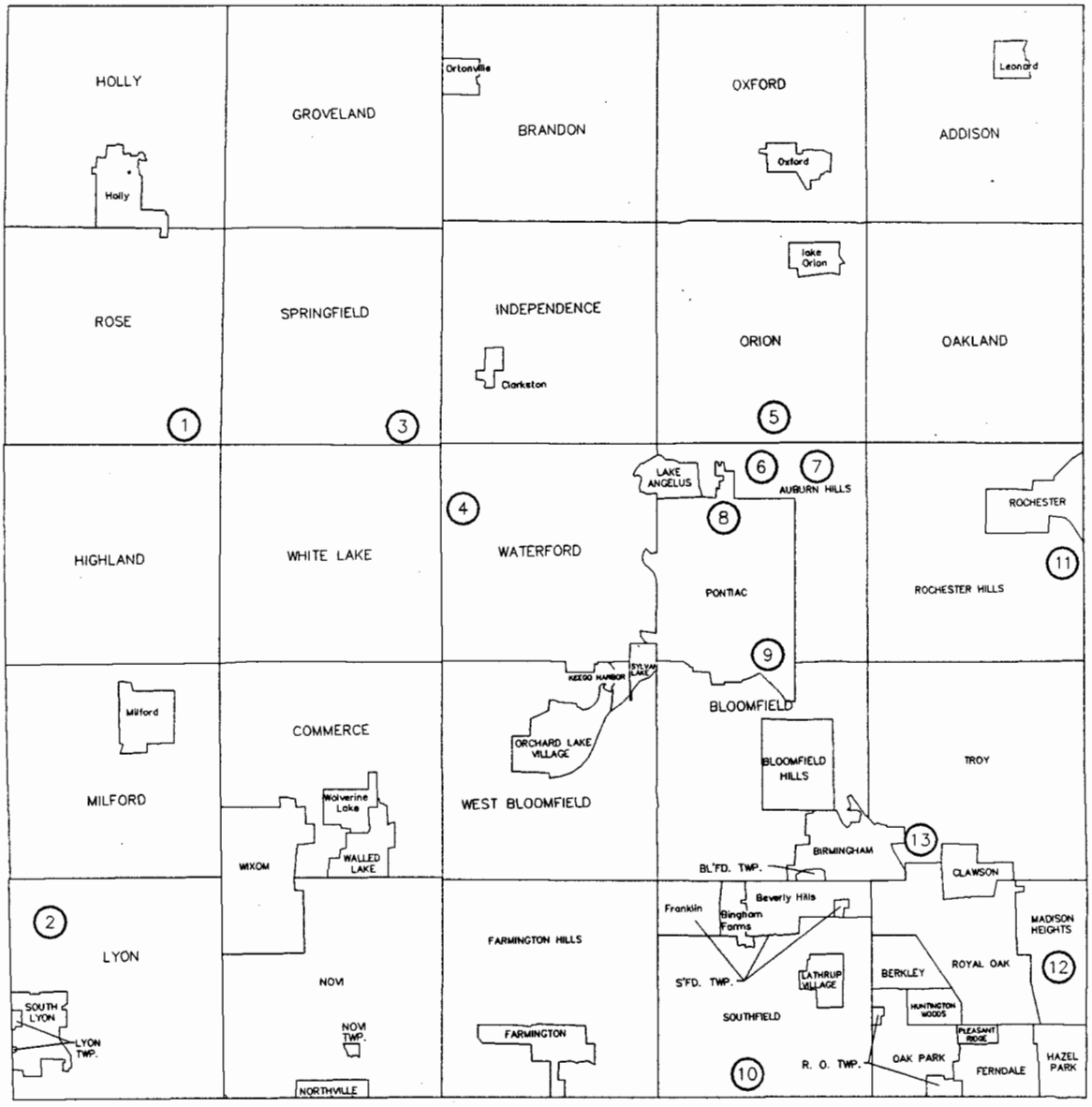
Objective criteria have been established to site waste processing and disposal facilities between Plan updates. The Board will have final decision-making authority for system site inclusion.

The following chart summarizes how the estimated waste will be disposed as the County meets its disposal goals through the components of the County's system for each of the planning period years. Figure 1.4-2 illustrates County waste management goals and landfill needs.

	YEAR		
	1989	1995	2010
Residential, Commercial, Industrial Waste Generated (TPY)	1,327,000	1,425,000	1,676,000
Waste Composted (TPY)[a]	0	(71,000)	(84,000)
Waste Reduction (TPY)[b]	0	(71,000)	(168,000)
Waste Recycled (TPY)[c]	0	(285,000)	(586,000)
Waste-to-Energy (TPY)[d]	0	(807,000)	(807,000)
Unprocessed Waste (TPY) to the Landfill	1,327,000	191,000	31,000
Recycling and Composting Residue (TPY)[e] to the Landfill	0	36,000	67,000
Ash Residue (TPY)[f] to the Landfill	0	242,000	242,000
Subtotal: Municipal Solid Waste	1,327,000	469,000	340,000
Construction/Demolition Waste (TPY)	141,000	149,000	169,000
Industrial Special Waste (TPY)	444,000	421,000	449,000
Total to Landfill (TPY)	1,912,000	1,039,000	958,000

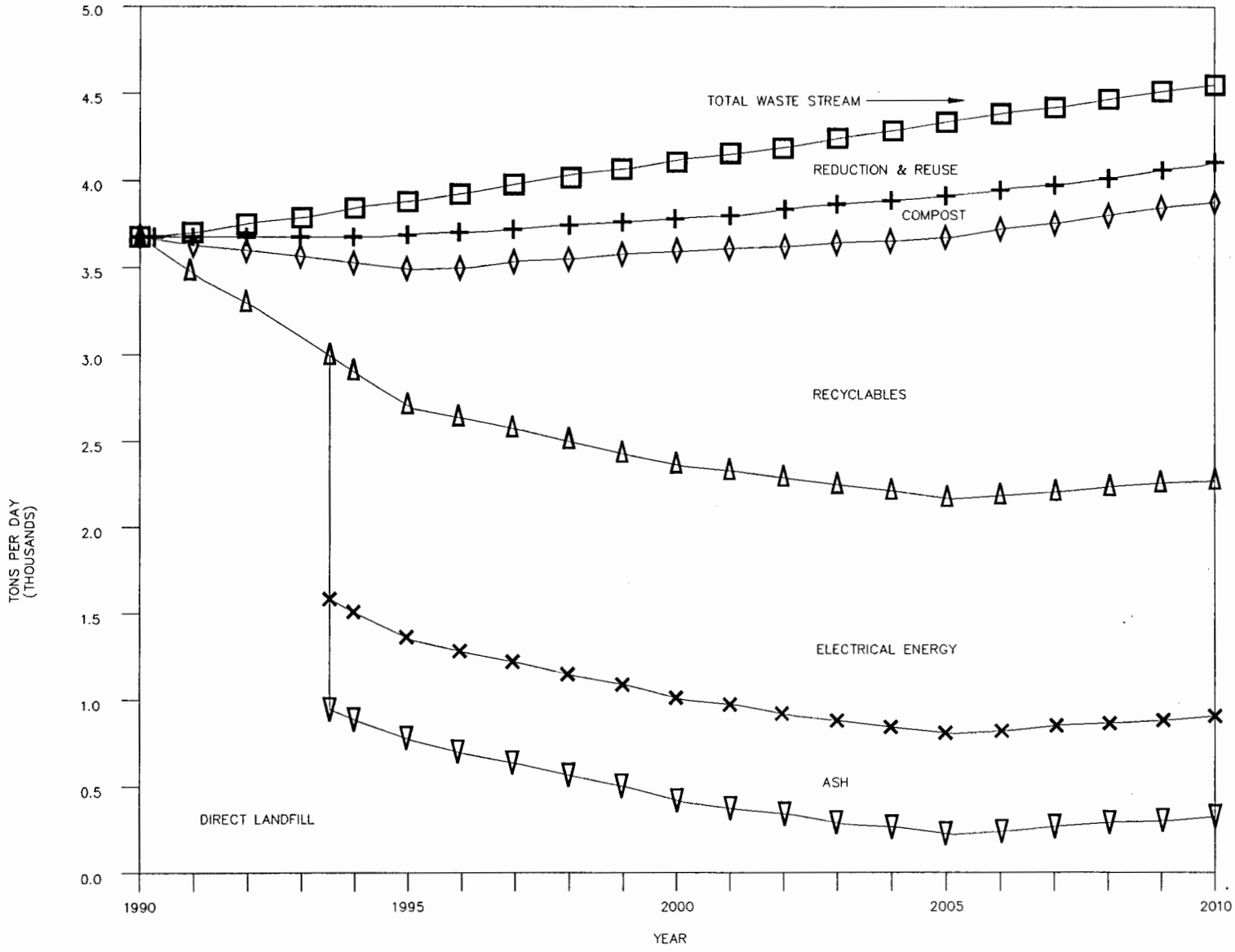
NOTES: (Percentages below stated in terms of total residential, Commercial and industrial waste).

a One or more facilities capable of composting 550 TPD 6 days per week during an 8-month growing season (approx. 5%)
b 5% by 1995, 10% by 2005.
c 1995 20%, 30% by 2000, 35% by 2005.
d 2600 TPD, 85% Availability.
e 10% of the Waste Recycled and Composted is residue
f 30% of the Waste-to-Energy becomes residue.



1. Recycling Facility
2. Lyon Development Landfill
3. Clarkston Disposal Recycling and Transfer Station
4. Waterford Hills Landfill
5. Eagle Valley Landfill
6. County Waste to Energy Facility/Transfer Station and Recycling Facility
7. Wayne Disposal–Oakland Landfill
8. City of Pontiac Collier Road Landfill and Recycling Facility
9. GM Shred/Burn Processing Facility
10. Laidlaw Transfer Station
11. SOCRRA Landfill
12. SOCRRA Waste–to–Energy Facility
13. SOCRRA Transfer Station and Recycling Facility
14. RRRASOC Recycling/Transfer Station–Location to be selected (see section 8.2)

FIGURE 1.4-1
PROPOSED AND EXISTING MUNICIPAL SOLID WASTE FACILITIES OAKLAND COUNTY, MICHIGAN



NOTE: THIS GRAPHIC REFERS ONLY TO MUNICIPAL SOLID WASTE

FIGURE 1.4-2

VOLUME REDUCTION GOALS

OAKLAND COUNTY, MICHIGAN

2.0 INTRODUCTION

Oakland County, Michigan (the County) began implementing an economically responsible and environmentally sound County-wide solid waste management system following approval of the Act 641 Plan for the County (November 1981) by the MDNR in July 1983. In accordance with Act 641, the Board has initiated actions to update the first plan, including the formulation of updated goals and objectives. This document, the plan update (the Plan), is submitted in accordance with Part 7 of Act 641.

2.1 PREPARATION OF THE PLAN UPDATE

Preparation of this Plan required actions by the MDNR, the Board and the SWPC.

In October 1987, the Board passed a resolution authorizing and directing the County Executive to act as the Designated Planning Agency in preparing a County-wide solid waste management plan update in accordance with Act 641. Oakland County's Notice of Intent to prepare a plan update was sent to the MDNR on November 12, 1987 and to all municipalities within the County on November 16, 1987.

In January 1988, the Board appointed the 14-person SWPC described in Act 641. The SWPC was reconstituted in February 1990.

State funding was available for preparation of Act 641 plan updates. Contracts were approved on December 1, 1987, November 7, 1988, and April 13, 1990 between the MDNR and the County that provided for the commitment of a portion of these funds to the County.

2.2 THE LEGAL AND INSTITUTIONAL STRUCTURE

In addition to Act 641, several other state and federal statutes apply to the preparation of a solid waste management plan.

There are 25 federal acts that may affect the County's Planning efforts. These include, among others, RCRA, Circular A-95, and the Clean Air Act amendments of 1970 and 1977.

Seventy state statutes may be applicable to implementation of a solid waste management plan. State legislation contains regulatory and procedural provisions, as does federal legislation, but also assigns specific responsibility to particular levels of government and agencies in the state. Of greatest pertinence to the County is Act 641 which requires development of solid waste management plans by county authorities and requires approval of construction permits by MDNR for solid waste handling and disposal facilities. The regulatory requirement most likely to affect Plan scheduling and implementation is the acquisition of permits from the MDNR.

2.3 GOAL OF THE PLAN

The primary goal of the Plan is to establish an integrated waste management system for the disposal of all non-hazardous solid waste produced by residential, commercial, and industrial waste generators in the County. The management system should achieve optimal environmental protection by maximizing waste reduction and reuse, composting, recycling, and minimizing the need for waste-to-energy and sanitary landfilling.

2.4 OBJECTIVES OF THE PLAN

Eight objectives have been established by the SWPC for the Plan:

1. Develop an administrative and technical framework to provide a complete solid waste management program for the County, including a long term policy goal for the County not to become a net importer of waste.

2. Identify the quantity and types of waste generated by residential, commercial, and industrial units in the County.

3. Coordinate solid waste management planning and implementation with the local municipalities.

4. Develop the methods, procedures, financial support, and time schedules for implementation of the Plan.

5. Reduce the volume to be landfilled through waste reduction and reuse, composting, recycling, and/or waste-to-energy.

6. Eliminate to the greatest extent possible pollution resulting from solid waste and maintain a high quality environment, preventing adverse effects on public health and the environment resulting from improper solid waste collection, transportation, processing or disposal, including the protection of groundwater and surface water quality, air quality and land quality.

7. Establish a program for source reduction, reuse, composting and source separation/recycling of no less than 30 percent of the municipal solid waste stream by 1995. The ultimate goal for reduction, reuse, and recycling/composting is 50 percent of the municipal solid waste stream by the year 2005.

8. Conserve fossil fuels by having energy recovery associated with incineration.

2.5 PLAN DEVELOPMENT

A data base of information has been developed to support evaluation and implementation of a specific solid waste management plan. The data base, with particular emphasis on waste generation and disposal alternatives, is presented in the following chapters. The plan presented in this document is based on the goal and objectives established by the County. Special emphasis was placed on reducing landfill use through maximum reliance on waste reduction, reuse, composting, recycling and waste-to-energy as needed. Financial and administrative considerations necessary to implement the Plan are also discussed herein.

3.0 DATABASE

3.1 WASTE GENERATION

To adequately plan for solid waste management, the amount and characteristics of the waste generated in the County must be determined. This information will allow options to be developed by the County, and specific design requirements to be generated for proposed facilities and programs.

The analysis of solid waste generation in a community requires careful consideration of many socioeconomic, environmental, and technological factors. Family income, employment rates, and the average size of residential lots are examples of factors that can influence substantially how much waste a community generates. In addition, waste generation quantities, characteristics, and sources are changing constantly. For example, seemingly insignificant changes in consumer habits and technology that have affected waste stream composition include: the widespread use of disposable diapers rather than cloth diapers, the replacement of disposable metal containers with paper or plastic to accommodate microwave ovens, and the shift from paper to plastic bags at supermarket checkout counters.

While changes in both technology and the socioeconomic composition of communities make it challenging to forecast accurately the types and amounts of wastes generated within the County for the next 20 (or more) years, reasonable estimates can be developed from the best available waste collection/disposal data.[1]

1/ Data sources that were carefully reviewed and considered as part of the waste generation analysis included:

1. Oakland County Solid Waste Management Plan, November 1981.

2. Oakland County, Michigan: Solid Waste Management Planning, Phase 1A; Volume 1, Data Base, November 1980.

(Footnote 1 continued on next page)

When analyzing and comparing solid waste generation rates, it is extremely important to examine how the rates were measured or estimated. It is rare to find rates that are strictly comparable, because communities vary significantly in: the types of wastes they collect; whether wastes from larger multi-family buildings are included in reported residential wastes; the extent to which various types and sources of commercial, industrial, and institutional wastes are included in reported values; and the reporting methods used (for example, factors used for converting volume to weight, and the reporting of truck volume versus actual volume of wastes).

Based on the study of waste generation rates and demographic data for the County, the following information was developed:

- In 1985, the County generated an estimated 1,966,000 tons of waste.

- By 2010, the County will be generating 2,294,000 tons of waste.

(Footnote 1 continued from previous page)

3. Determination of Solid Waste Generation Rates for Industrial, Commercial, and Institutional Waste Generators in Oakland County, Michigan, prepared for Oakland County DPW by CDM, September 1986. (Footnote 1 continued on next page)

4. The Analysis of Solid Waste Disposal Fee Structure for the Oakland County Solid Waste Management Plan, prepared for Oakland County DPW and Municipal Solid Waste Board by CDM, September 1987.

5. Waste tonnages received by the Southeast Oakland County Resource Recovery Authority (SOCRRA) for the years 1981 through 1987.

6. Waste tonnages received by the City of Pontiac at the Collier Road Landfill for the years 1985 and 1986.

7. Solid Waste Stream Assessments, sponsored by the Michigan DNR for Macomb County, Chippewa County, Lapeer County, Marquette County, Delta County, and Isabella County, all dated March 1987.

8. Solid waste studies for several other communities in Michigan.

9. Waste generation rates prepared by USEPA, CDM, or others for similar communities elsewhere in the U.S.

The following sections describe how these estimates were developed. All of the tables and figures used as a reference are at the end of Section 3.

3.1.1 ESTIMATION OF WASTE GENERATION RATES

Data from a wide range of sources were examined to estimate current waste generation in the County. Table 3.1-1 summarizes waste generation rates reported in the literature.

Residential

Waste generation rates for residential sources usually can be estimated with substantially greater accuracy than those for commercial, industrial, and institutional sources. This is largely because household waste generation rates vary the least, and more comparable data for residential sources have been reported.

A recent study of waste generation in the County, entitled Determination of Solid Waste Generation Rates for Industrial, Commercial, and Institutional Waste Generation in Oakland County (September 1986), assumed residential waste generation to be approximately 1.5 tons per household per year (2.9 lb. per capita per day), based on the November 1981 Plan. As part of the current plan update, the most recent waste generation/collection data were reviewed to evaluate the accuracy of the earlier estimated rate of residential waste generation.[2]

2/ The average amount of waste received by SOCRRA for all member communities is 3.61 lb. per capita per day, or 10.02 lb. per household per day. On an annual basis, these values are equivalent to 0.66 tons per capita per year, or 1.83 tons per household per year. Thus, the amount of wastes received by SOCRRA is greater than the previously mentioned estimate of residential waste generation, 1.5 tons per household per year. This result is expected, because wastes are received by SOCRRA from commercial, industrial, and institutional sources as well as residential sources. Because data are not available to depict accurately the number of businesses and institutions served by SOCRRA, it is not possible to determine what portion of wastes received by SOCRRA come from residential sources. Therefore, the estimated residential waste generation of 1.5 tons per household per year appears reasonable in light of SOCRRA data, but cannot be confirmed with the data alone.

The most useful data for evaluating residential waste generation in the County includes waste quantities that were provided by SOCRRA and the City of Pontiac.

Table 3.1-2 reports waste quantities received by SOCRRA from its 14 member communities on both a per capita basis and a per household basis.[3]

The City of Pontiac is the closest approximation in the county to a "closed system," in which all wastes that are generated within a community are disposed within the same community. Therefore, waste generation rates computed from waste quantities received at the Collier Road Landfill should be fairly accurate estimations of actual waste generation in Pontiac.

Table 3.1-3 lists the quantities of waste received at Collier Road Landfill. The amount of residential waste received at the Collier Road Landfill for 1985 and 1986 averaged approximately 1.20 tons per household per year. However, waste collected from large, multi-family residential buildings is reported under the "commercial" rather than the "residential" category. Therefore, a residential waste generation rate based on the Collier Road Landfill data would underestimate the actual rate. The previous estimate of 1.5 tons per household per year does not conflict with the Pontiac data.

3/ Estimates by SEMCOG of population, number of households, and employment were used to compute these waste generation rates.

According to SOCRRA officials, the wastes received by SOCRRA include most residential wastes except those from large apartment/condo minimum buildings, and an undetermined percentage of commercial, institutional, and industrial housekeeping waste. Therefore, waste generation rates computed from SOCRRA data should generally exceed residential-only waste generation rates, depending on the extent to which commercial, industrial, and institutional facilities exist in each community, and the extent to which the wastes from these sources are included in quantities received by SOCRRA.

Conclusion Regarding Residential Waste Generation. Based on these internal checks with data from SOCRRA and the City of Pontiac, and from comparisons with data from similar communities elsewhere in Michigan and other areas of the United States, the previous estimate of 1.5 tons per household per year (2.9 lb. per capita per day) appears reasonable and accordingly is used in this study.

Commercial and Industrial Waste

Communities within the County exhibit substantial differences in their commercial and industrial activity, and correspondingly, generate significantly different amounts of waste from these sources. Therefore, although residential waste generation can be estimated fairly accurately on a per capita basis, estimating commercial, industrial and institutional waste generation requires measuring the level of these activities in a community. Generally, the most widely used measure for estimating waste is employment, although other parameters, such as floor space, land use acreage, and sales, are also occasionally used.

Existing sources of employment data and waste generation data were examined to help develop a method for estimating the quantities of waste generated by commercial and industrial sources. A methodology was developed that would:

- Be as accurate as available data sources would allow.
- Be structured to readily incorporate existing data regarding current and projected employment levels.
- Be verifiable, if possible, by comparison with recorded, collected waste quantities.

The type of employment data used for future projections is discussed in Section 3.1.3. Waste generation data that were considered as part of this evaluation are described next.

A variety of data sources were reviewed to develop a reasonable estimate of per-employee waste generation in the County. The City of Pontiac is the only community in the County that has data quantifying the total amount of commercial/industrial wastes collected within its borders. City officials believe most commercial/industrial wastes generated within the City are received at the Collier Road Landfill because of its relatively low tipping fees.

A second source that was used to help estimate commercial/industrial waste generation rates is the report The Analysis of Solid Waste Disposal Fee Structure for the Oakland County Solid Waste Management Plan, dated September 1987. This report included a test application of a waste generation estimating methodology, which was applied to the Village of Holly, Holly Township, and the City of Ferndale. For each of these communities, commercial and industrial wastes were estimated by using employment and floor space data multiplied by corresponding waste generation factors. Institutional waste generation was estimated by applying appropriate generation rates to the number of students and the numbers of hospital beds. Division of total commercial and industrial wastes in those communities by the total employment provides a reasonably accurate estimate of total commercial/industrial waste generation on a per employee basis.

Table 3.1-4 summarizes the computation of the estimated overall commercial/industrial waste generation rates for these Oakland County communities.

Conclusion Regarding Commercial/Industrial Waste Generation. Other sources also were reviewed to provide background for estimating commercial and industrial waste generation rates, including a recent waste survey conducted by the MDNR for Macomb County, Michigan. (Refer to Table 3.1-1). Based on this comprehensive review of available data, generation rates calculated in the Michigan Energy and Materials Recovery State Plan were chosen as representative rates for the County: 5.75 lb/commercial employee/day and 10.61 lb/ industrial employee/day. Other sources of data that were examined did not conflict with these rates, and total waste

generation volumes calculated for the County using these rates are comparable to estimates of total waste volumes using reported waste disposal rates.

Construction/Demolition Wastes

Construction/demolition wastes are composed largely of concrete, asphalt, wood, metal, and plaster. No good sources of data regarding its generation in the County are available. Therefore, the generation of such wastes in the County was estimated to equal 0.7 lb/capita/day, in accordance with a recent U.S. EPA estimate of the nationwide generation of such wastes.[4]

Industrial Special Wastes

Industrial special wastes include a wide variety of non-hazardous wastes which, due to their size or composition, require special handling and/or disposal procedures. Industrial special wastes are extremely difficult to estimate on a per capita basis. The industrial activity must be determined in a particular area. This is particularly true in light of non-hazardous cleanup waste such as that associated with underground storage tank replacements and site remediation by the private sector. The generation of such wastes in the County is estimated to be approximately 412,000 tons in 1990 (refer to Section 3.1.4 for details).

Michigan regulations allow such wastes to be disposed at Type II landfills, although MDNR may require that such wastes be segregated, receive special handling, and/or be subject to special testing.[5] Some industrial special wastes, such as fly ash from coal fired boiler houses or foundry sand may also

4/ (U.S. EPA, Characterization of Municipal Solid Waste in the United States; 1960-2000, July 1986).

5/ (Michigan Administrative Rules, R299.4311).

be disposed in a Type III landfill. Type II landfills are defined by MDNR as on-land disposal facilities designed and operated to accommodate general types of solid waste, including, but not limited to, garbage and rubbish, but excluding hazardous waste. Type III landfills are defined by MDNR as on-land disposal facilities designed and operated to accommodate large volumes of certain types of solid waste having minimal potential for groundwater contamination. Examples of industrial special wastes include foundry sands, incinerator/boiler bottom ash, fly ash, sludges, and wastes from manufacturing processes.

The most accurate and complete data regarding the generation of industrial special wastes in the County are from a 1980 survey of major generators of industrial special wastes. This survey[6] included the analysis of questionnaire data from 58 industrial establishments and on-site visits to several of these facilities. This analysis produced the generation rates for industrial special wastes in the County shown in Table 3.1-5. These rates may be high for current industrial special waste generation due to increasing recycling and source reduction efforts, but these are the most current, directly applicable rates available for the purposes of this Plan.

3.1.2 CURRENT WASTE QUANTITIES

Using the County's current population and employment data (refer to Table 3.1-6, 3.1-7 and 3.1-8) and the waste generation rates discussed herein, estimates of current waste generation in the County were developed (for the years 1985 and 1990).[7] In 1985 and 1990, approximately 1.9 million tons of waste will have been generated in the County each year.

6/ Documented in Oakland County, Michigan: Solid Waste Management Planning, Phase IA, Volume 1, Data Base (November, 1980)

7/ Table 3.1-9 summarizes the residential, commercial and industrial waste generation estimates; Table 3.1-10 summarizes construction/demolition waste generation; Table 3.1-11 summarizes industrial special waste generations; and Table 3.1-12 provides a summary of all wastes in the County

3.1.3 PROJECTIONS OF POPULATION AND EMPLOYMENT

Population projections for each civil division in the County are listed in 5-year increments in Table 3.1-6. Corresponding projections of the number of households by civil division are listed in Table 3.1-7.

Table 3.1-8 lists employment projections from SEMCOG, by civil division, for the years 1985 to 2010.[8] These projections provide estimates of employment for two classifications:

- Industrial, including
  - Natural resources
  - Auto manufacturing
  - Other manufacturing

- Other (considered in this plan as commercial), including
  - Transportation, communications and utilities
  - Wholesale
  - Retail
  - Financial, insurance, and real estate
  - Services
  - Public administration
  - Institutional

8/ The data in Tables 3.1-6 and 3.1-7 were provided by SEMCOG as an update to the Small Area Forecast, Version No. 84 (May 1988). The data in Tables 3.1-6 and 3.1-7 also include adjustments, issued by SEMCOG, to the estimates of population and households for the cities of Wixom and Rochester Hills, for the years 1985 and 2005. The City of Northville is not included in these tables because Northville is in the solid waste management plan for Wayne County. Data for 1985, 1995, and 2005 were linearly interpolated from the SEMCOG projections.

3.1.4 PROJECTED WASTE QUANTITIES

Projected average daily residential wastes, commercial wastes, and industrial wastes for the above years are presented in Table 3.1-9. Values are presented separately in Table 3.1-9 for each civil division and subsystem in Oakland County. It is important to note that the daily tonnages are based on 365 days per year (a 7-day week rather than a 5-day work week), and do not reflect the substantial seasonal fluctuations that occur in waste generation throughout the year.

Projections of the generation of construction/demolition wastes in the County for the period 1985-2010, are presented in Table 3.1-10.

Table 3.1-13 presents the calculation of industrial special wastes on a County-wide basis for the year 1985. The quantities of special wastes that are estimated in Table 3.1-13 are based on 1985 employment data from the U.S. Bureau of Census for selected two-digit SIC codes, and on the special-waste generation rates that were estimated in the Phase 1A Data Base (November 1980), which are shown in Table 3.1-5. Special wastes are estimated only for those industries in the County that were identified during the 1979 industrial waste survey as significant sources of industrial special wastes in the County. Note the predominance of the primary metal industries (SIC 33) and the transportation equipment industries (SIC 37) in the amounts of special wastes produced.

Because estimates of employment by two-digit SIC code are not available for the years 1990 to 2010, it was necessary to adopt another approach for estimating special waste generation in these future years. SEMCOG data were available that provided estimates of 1985 County-wide employment for nine categories, including two categories titled "auto manufacturing" and "other manufacturing". Therefore, to estimate the future generation of special waste for those industries listed in Table 3.1-13, the 1985 waste generation for SIC 37 was projected forward using SEMCOG's growth pattern for "auto manufacturing", and the combined 1985 waste generation for SIC 20, 23, 25, 30-36, and 39 was projected forward using SEMCOG's growth for "other manufacturing". Because Collier Road Landfill reports a 168,200 ton per year

decrease in industrial special waste disposed due to industrial closings which are not reflected in SEMCOG's "other manufacturing" projections, the projections resulting from subtracting this decrease from special waste generation numbers based on employment are shown in Table 3.1-11.

County-wide projections of waste generation from all sources are summarized in Table 3.1-12. In summary, waste generation for 1995, 2000, 2005 and 2010 are estimated as 1,996,000 tons, 2,095,000 tons, 2,193,000 tons, and 2,294,000 tons, respectively.

3.1.5 SEASONAL VARIATION IN WASTE GENERATION

Solid waste quantity data previously presented represent the average generation of solid waste over a yearly period. Solid waste generation rates vary over the course of a year, principally due to the higher generation of grass clippings during summer months and the collection of leaves in the fall. Additional reasons include cycles in industrial production and retail activity, periods of school attendance, and periodic special pickups for large, bulky items.

Variations in waste generation must be considered in planning solid waste facilities and programs to meet peak processing requirements economically.[9]

9/ Data from SOCRRA and the City of Pontiac were reviewed and analyzed to estimate seasonal variations in waste generation for the County. Data from SOCRRA for the year July 1985-June 1986 showed that the minimum occurred in February, at a rate of 66 percent of average monthly rate. The maximum rate occurred in November at 127 percent greater than the average monthly rate. Corresponding figures for the period July 1986-June 1987 were 67 percent and 140 percent, respectively. Data from the City of Pontiac's Collier Road landfill indicate that for the last complete year of record, July 1985-June 1986, the monthly maximum amount of non-special wastes received was 125 percent of the monthly average, and the monthly low was 65 percent of the average. In comparing these values, it should be noted that the SOCRRA values do not include much of the commercial and non-special industrial wastes, which generally exhibit less seasonal fluctuation in generation than do residential wastes. Based on the above data and published values for other areas of the United States similar to the County, it is estimated that in the County, peak monthly solid waste generation rates would be approximately 130 percent of the average monthly generation, and the minimum rate would be approximately 70 percent of the average monthly value.

3.2 WASTE COLLECTION AND HAULING PRACTICES

To integrate a solid waste management system for the County, it is useful to know the disposal practices of each community.[10] However, the Plan does not comtemplate any change within the County concerning hauling and transportation.

In general, the more densely populated municipalities in the County provide contractors to collect and dispose of their waste. Residents in the more rural areas contract with a private collector or transport their waste to a disposal site in their own vehicles.

Twenty-two of the twenty-nine cities in the County use a private waste hauling company for collection. Madison Heights and Pontiac have city-owned waste collection services. Twelve cities, Royal Oak Township and the Village of Beverly Hills dispose of their wastes through SOCRRA. The City of Pontiac is the only municipality that operates its own landfill.

All County townships except two require the individual homeowner to contract for private collection. Royal Oak Township has a contract with a private hauler and has its waste disposed through SOCRRA. Commerce Township has approximately 25 percent of its residential waste collected by a contractor.

The villages in the County have contracts with various private haulers, with the exception of Clarkston and Ortonville. In these two villages, individual homeowners must contract with private haulers.

10/ The data for this section was gathered from telephone surveys of municipal personnel and questionnaires sent to municipal offices. The current solid waste disposal practices of Oakland County communities are outlined in Table 3.2-1, located at the end of Section 3.

When this information was collected, six landfills were operating in the County. The most used facilities were SOCRRA and the Lyon Land Development Company Landfill. Currently, 14 municipalities use SOCRRA, and some or all of the waste from 13 other municipalities goes to the Lyon Land Development Landfill. Although most of the County's residential waste is handled within the County, ten municipalities and SOCRRA have some or all of their waste taken out of the County. Exported residential waste is landfilled primarily in Washtenaw and Genesee Counties.

3.3 EXISTING DISPOSAL RESOURCES

The information contained in this section was gathered from questionnaires and telephone conversations with sanitary landfill and incinerator operators (February-March 1988). Other sources of information include the MDNR, the SWPC, and the County's 1981 Solid Waste Management Plan.

The County uses three primary means of waste disposal/reduction:

- Sanitary landfills in the County (receive the majority of the waste stream)
- Sanitary landfills in surrounding counties (receive a portion of the waste stream)
- The General Motors shred/burn facility.

The following sections discuss these disposal facilities in greater detail.

3.3.1 EXISTING SANITARY LANDFILL FACILITIES WITHIN THE COUNTY

As of March 1988, the County has six permitted and operating sanitary landfills, including:

- City of Pontiac Collier Road Sanitary Landfill
- Eagle Valley Sanitary Landfill
- Lyon Land Development Sanitary Landfill

- o Southeastern Oakland County Resource Recovery Authority (SOCRRA)
- o Waterford Hills Sanitary Landfill
- o Wayne Disposal -- Oakland Sanitary Landfill

The locations of these sanitary landfills are shown on Figure 3.3-1, located at the end of this section.

Permitted sanitary landfill space within the County is extremely limited. Half of the operating landfills have a remaining life of under five years (as of March 1988). The total remaining in-place volume in the existing permitted landfills is approximately 18.6 million cubic yards.[11] Using the County's total landfill disposal rate of 3 million cubic yards a year, the remaining life for operating sanitary landfills is 6.2 years (or mid-1994). However, these landfills will not be able to handle the County's waste for this entire period. As some landfills close, remaining operating landfills will not be able to accept all of the diverted wastes, and new facilities will be required to dispose of the excess waste.

11/ The capacities and disposal rates for all of the landfills operating as of March 1988 are:

Landfill	Remaining Volume (in-place cubic yards)[a]	Disposal Rate (in-place cubic yards/yr)[a]	Remaining Life Reported (yrs)[a]
City of Pontiac Collier Road	2,348,600	180,000	11.4 - 13.1
Eagle Valley	953,000	658,500	1.5 - 3.0
Lyon Land Development Co.	6,000,000	878,000	5.0 - 7.0
SOCRRA	260,900	270,000	1.0 - 1.5
Waterford Hills	5,000,000	420,000	9.0 - 12.0
Wayne Disposal--Oakland[b]	4,000,000	600,000	4.0 - 5.0
Total	18,562,500	3,006,500	6.2

[a] All values were supplied by landfill owners and operators. Adjustments were made as needed to account for daily and final cover.
[b] Updated as of June 1989.

Approximately 20 to 30 percent of the material going to landfills within the County is generated outside of the County.[12] This is balanced by a similar amount being exported from the County (not including the present disposal of SOCRRA's waste).

Detailed descriptions of the six landfills are presented in the following sections. Data compiled for these sanitary landfills consists of site descriptions, permits, composition and source of the solid waste accepted, remaining life, expansion plans, and litigation.

City of Pontiac Collier Road Sanitary Landfill

Site Description. The City of Pontiac Collier Road Sanitary Landfill is located north of Collier Road in the City of Pontiac and occupies portions of Sections 4, 5, 8, and 9 of Pontiac Township within the city limits (see Figure 3.3-1). The facility is city-owned and operated by the Sanitation Division of the Pontiac Department of Public Works. The permitted acreage of the facility is 90.65 acres, 44 acres of which are included in a recently approved vertical expansion.

12/ The following summarizes the percent of out-of-County waste received at Oakland County landfills:

Sanitary Landfill	Volume (cubic yards/year)	Percent
City of Pontiac Collier Road	None	0
Eagle Valley	131,700	20
Lyon Land Development Co.	285,400	25-40
SOCRRA	None	0
Waterford Hills	105,000	25
Wayne Disposal--Oakland	163,700	30
Total	685,800	23

Waste Stream Analysis. The City of Pontiac Collier Road Landfill accepts only wastes that are generated within the corporate city limits of Pontiac. Recent plant closings within the city produced a 37 percent decrease in the disposal rate between the years 1985 and 1986. Because of a lengthy dispute with the MDNR, the landfill was ordered to close for approximately one year, during 1987.[13]

Disposal of fly ash from coal fired boiler houses and foundry sand (considered "other" waste) was discontinued gradually during 1985, which accounts for most of the decrease in waste received at the landfill from 1985 to 1986. Questionnaire responses and telephone conversations indicate that further decreases are anticipated at the City of Pontiac Collier Road Landfill, stabilizing at 180,000 in-place cubic yards a year. Assuming this disposal rate, the landfill operator reported a projected life of approximately 13 years for the City of Pontiac Collier Road Landfill (as of March 1988).

Expansion Plans. The City of Pontiac conducted an Engineering Feasibility Study in 1985 that indicated it may be possible to laterally expand the landfill to the north of the existing solid waste boundary. The expansion would add another 8 years of useful life to the facility. The City of Pontiac has not yet applied for a permit for this lateral expansion.

13/ The volume, type, and source of waste accepted at the City of Pontiac Collier Road Landfill from 1985 to 1987, as reported by the landfill operator are as follows:

Type	Waste Received (In-Place Cubic Yards)			% Waste Received From Outside Oakland County
	1985	1986	1987	
Residential	57,200	53,400	0	0
Commercial	88,500	81,600	0	0
Industrial	9,100	11,100	0	0
Other	344,700	164,700	0	0
Total	499,500	312,700	0	0

Litigation and Other Concerns. No litigation is pending. As of March 3, 1988, the Oakland County Environmental Health Division does not report any outstanding violations during its inspections since the landfill reopened in December 1987.

The City of Pontiac Collier Road Landfill is listed in the MDNR Sites of Environmental Contamination Proposed Priority Lists (Act 307 List). The City opposes this listing and is taking action to delist the landfill.

Eagle Valley Sanitary Landfill

Site Description. Eagle Valley Sanitary Landfill, formerly the Weber Sand and Gravel site, is located on Silver Bell Road, west of M-24 in Orion Township (see Figure 3.3-1). The Eagle Valley facility, which started operation in December 1985, is now operated by Waste Management and permitted by the MDNR for 28 acres.

Waste Stream Analysis. Unlike the City of Pontiac's Collier Road Sanitary Landfill, the Eagle Valley facility shows an evenly proportional increase for all waste types. Solid waste disposal rates between 1986 and 1987 increased approximately 66 percent.[14] Waste Management estimates between 1.5 and 3.0 years of remaining life for the Eagle Valley facility.

14/ A summary of the Eagle Valley Sanitary Landfill is as follows:

Type	Waste Received (In-Place Cubic Yards)			% Waste Received From Outside Oakland County
	1985	1986	1987	
Residential	61	89,800	263,400	NA[a]
Commercial	0	89,800	263,400	NA
Industrial	0	46,900	125,100	NA
Other	0	2,500	6,600	NA
Total	61	227,700	658,500	20

[a]Not Available

Also unlike the Collier Road Sanitary Landfill, the Eagle Valley facility is not a closed system. Waste Management estimates that 20 percent of the total solid waste accepted at the facility is generated from Macomb, Lapeer, and Wayne Counties.

Expansion Plans. The previous owner to Waste Management (Weber) originally requested designation from the SWPC and Board to landfill on 190 acres, but the Board rejected the proposal. After two further attempts the Board approved 28 acres of the original 190 acres for inclusion in the 1981 Oakland County Solid Waste Management Plan.

Waste Management continues to express interest in expanding the Eagle Valley facility by 162 acres. A hydrogeological investigation conducted by Waste Management for the initial application to the Board concluded that the proposed expansion area is suitable for landfilling.

Litigation and Other Concerns. Two lawsuits involving this facility are currently pending: Orion Township and a homeowners group in the vicinity are opposing this site. The Oakland County Environmental Health Division does not report any outstanding violations at the Eagle Valley facility.

Lyon Land Development Company Phase II Sanitary Landfill

Site Description. The Lyon Land Development Company Sanitary Landfill, operated by Browning-Ferris Industries (BFI), is located in the northwest quadrant of Lyon Township at the I-96 and Milford Road interchange (see Figure 3.3-1). Phase II of the Lyon Development facility is permitted for 60 acres under Act 641, P.A. of 1978 and has been in operation since September 1982.

Waste Stream Analysis. BFI could not provide a detailed breakdown of the waste stream by waste type for the Lyon Development facility.[15]

The disposal rate at this landfill has increased approximately 19 percent between 1985 and 1987. BFI estimates that between 25 and 40 percent of the waste disposed at the Lyon Development facility is generated outside of Oakland County. Remaining life at the landfill is estimated by BFI to be 5 to 7 years. BFI accepts waste from Oakland County, Wayne County, Washtenaw County, Livingston County and Macomb County at its Lyon Development Sanitary landfill.

Expansion Plans. The Lyon Land Development Company currently has no plans for expansion of their sanitary landfill.

Litigation and Other Concerns. The Oakland County Environmental Health Division does not report any outstanding violations at the Lyon Land Development Company facility. Additionally, no litigation is pending.

BFI officials indicated that there has been out-of-state interest in using their facility, with haulers offering to pay twice the current tipping fees to use the landfill. BFI reported that they are not considering these offers.

15/ A summary of the Lyon Land Development Company Sanitary Landfill waste stream is as follows:

Type	Waste Received (In-Place Cubic Yards)			% Waste Received From Outside Oakland County
	1985	1986	1987	
Residential	NA[a]	NA	NA	NA
Commercial	NA	NA	NA	NA
Industrial	NA	NA	NA	NA
Other	NA	NA	NA	NA
Total	711,042	774,815	877,541	25-40

[a]NA = Not Available

SOCRRA Sanitary Landfill

SOCRRA is responsible for the disposal of refuse generated in 14 communities in southeastern Oakland County.[16] Collection of refuse is the responsibility of each community, and a disposal fee of $30 per ton (May 1989) is charged to them for disposal of their refuse.

The governing body of SOCRRA is a Board of Trustees. The Board of Trustees is made up of one representative from each member municipality appointed by their respective governing bodies. The Board of Trustees appoints a General Manager to direct SOCRRA.

SOCRRA operated an incinerator until July 1988; it continues to operate a transfer station and a landfill. However, currently most of the waste generated within SOCRRA is being exported from Oakland County, and the landfill site is being used for minimal landfilling and composting. The incinerator and transfer station are discussed in subsequent sections. Appendix B contains SOCRRA's current and future operating plans. This section discusses the SOCRRA landfill.

Site Description. The SOCRRA Sanitary Landfill is located in Sections 13 and 24 in the City of Rochester Hills. Most of the landfill lies between School Road and Avon Road (see Figure 3.3-1). This landfill has been operating since 1958 and is permitted under Act 641, P.A. of 1978.

Waste Stream Analysis. The SOCRRA Sanitary Landfill accepts only wastes generated within the SOCRRA district. The authority handles most residential and some commercial refuse (15 to 20 percent) as well as leaves and brush from the district. Prior to facility shut-down, most of the

16/ They are the cities of Berkley, Birmingham, Clawson, Ferndale, Hazel Park, Huntington Woods, Lathrup Village, Madison Heights, Oak Park, Pleasant Ridge, Royal Oak and Troy; the Village of Beverly Hills; and the Township of Royal Oak. The area encompassed within these municipalities totals approximately 80 square miles, with an estimated population of 360,000.

residential and commercial waste was incinerated; leaves and brush are composted. The landfill received incinerator ash (when SOCRRA's incinerator was operating) and unprocessed refuse from the district when the incinerator was not in service or during times of peak waste generation. Landfilling was done at a constant rate.[17]

SOCRRA estimates only 1 to 1.5 years of remaining life at the landfill. Currently SOCRRA is sending its waste to other landfills within and outside of the County, because its incinerator is not operating.

Expansion Plans. SOCRRA is trying to obtain a permit for 57 acres north of Avon Road to expand the sanitary landfill as an ash monofill. Assuming rehabilitation of the incinerator facility, this expansion will handle SOCRRA's ash disposal requirements for approximately 25 years. SOCRRA has designated a design team to develop plans and specifications for the landfill to satisfy State ash monofill requirements. SOCRRA will require additional landfill capacity for bypass waste and waste that cannot be composted, recycled, or combusted.

Litigation and Other Concerns. Expansion of the facility with the final 57-acre parcel is now in litigation. The MDNR Air Quality Division rejected SOCRRA's application for a permit, because it believed that the

17/ A summary of the SOCRRA Sanitary Landfill waste stream is as follows:

Type	Waste Received (In-Place Cubic Yards)			% Waste Received From Outside Oakland County
	1985	1986	1987	
Res/Com[a]	120,000	120,000	120,000	0
Industrial	0	0	0	0
Other[b]	150,000	150,000	150,000	0
Total	270,000	270,000	270,000	0

[a]Res = Residential, Com = Commercial
[b]Other = Incinerator Ash

proposed 300 foot buffer zone would not adequately control odors for the surrounding residential area. SOCRRA has appealed MDNR's decision. A neighboring trailer park is also opposing the expansion. The Oakland County Environmental Health Division does not report any outstanding violations at the SOCRRA landfill.

Waterford Hills Sanitary Landfill

Site Description. The Waterford Hills Sanitary Landfill has been operating since February 1982 and is located north of Gale Road in Waterford Township at the White Lake/Waterford Township border (see Figure 3.3-1). The facility is permitted under Act 641, P.A. of 1978 as a Type II facility on 50.7 acres. Oakland Disposal, Inc. operates the facility, which has between 25 and 30 acres remaining for landfilling.

Waste Stream Analysis. Oakland Disposal estimates that approximately 25 percent of the waste landfilled is generated from outside Oakland County and reports that Oakland, Wayne, Macomb, and Washtenaw Counties use their facility. A three year average was given by Oakland Disposal for each year.[18] Because these numbers reflect averages, it is impossible to make any inferences about the decline or growth of the annual disposal rate.

Oakland Disposal estimates between 9 and 12 years of remaining life at the Waterford Hills Sanitary Landfill.

18/ A summary of the Waterford Hills Sanitary Landfill waste stream is as follows:

Type	Waste Received (In-Place Cubic Yards)			% Waste Received From Outside Oakland County
	1985	1986	1987	
Residential	231,200	231,200	231,200	27
Commercial	126,000	126,000	126,000	23
Industrial	63,200	63,200	63,200	20
Other	0	0	0	0
Total	420,400	420,400	420,400	25

Expansion Plans. Oakland Disposal has no plans for expansion at the Waterford Hills facility. However, they do anticipate adding a processing center to recover recyclables from the waste stream.

Litigation and Other Concerns. Sections of the Waterford Hills facility are within 10,000 feet of a runway servicing jet aircraft. This is a violation of Act 641 Regulations, which require that a minimum 10,000 foot buffer be maintained. As a result, the Waterford Hills facility is operating under a court order as a Type II facility; however, because of potential environmental problems with operating, the site was designated in the original Plan and is designated in this Plan as a Type III facility.

The Oakland County Environmental Health Division does not report any outstanding violations at the Waterford Hills facility.

Wayne Disposal--Oakland Sanitary Landfill

Site Description. This facility began operations in October 1985 and is located on the south side of Brown Road between Giddings Road and M-24 in Auburn Hills (see Figure 3.3-1). The Wayne Disposal--Oakland Sanitary Landfill is comprised of approximately 43 acres and is permitted under Michigan Act 641, P.A. of 1978.

Waste Stream Analysis. Wayne Disposal did not report individual quantities of residential, commercial, and industrial waste. As a result, the volume of waste received is reported as one value.[19] Between 1986 and 1987, the Wayne

19/ A summary of the Wayne Disposal - Oakland Sanitary Landfill waste stream is as follows:

Type	Waste Received (In-Place Cubic Yards)			% Waste Received From Outside Oakland County
	1985	1986	1987	
Res/Com/Ind[a]	54,400	409,000	490,900	NA[b]
Other	6,100	45,500	54,600	NA
Total	60,500	454,500	545,500	30

[a]Res/Com/Ind = Residential/Commercial/Industrial
[b]NA = Not Available

Disposal--Oakland facility's annual disposal rate increased 17 percent. Solid waste from outside of Oakland County comprises approximately 30 percent of the waste received.

Wayne Disposal estimates 4.0 to 5.0 years of remaining life for their Oakland facility and recognizes reports that Oakland, Wayne and Macomb Counties use the facility.

Expansion Plans. Wayne Disposal increased the capacity of the landfill with an additional 2.5 million cubic yards in May 1989. No further expansion is planned.

Litigation and Other Concerns. No litigation is pending. The Oakland County Environmental Health Division reports no outstanding violations.

3.3.2 SURROUNDING COUNTY SANITARY LANDFILLS UTILIZED BY OAKLAND COUNTY

Currently a free flow of waste exists across County borders. Based on surveys received from the County's municipalities and discussions with haulers servicing the municipalities, waste is being taken to landfills located in Wayne, Macomb, Washtenaw, Lenawee and Genesee. The following landfills were listed as receiving waste from the County:

- Sexton Landfill (Lapeer)
- Arbor Hills Landfill (Washtenaw County)
- Genesee Landfill (Genesee County)
- Montrose Landfill (Genesee County)
- Grand Blanc Landfill (Genesee County)
- Wayne Disposal - Belleville (Wayne County)
- Pine Tree Acres (Macomb County)
- Laidlaw (Lenawee County)

3.3.3 SOCRRA INCINERATOR

Facility Description

Currently (April 1990), SOCRRA is proceeding with plans for the rehabilitation of its municipal waste incinerator, located in Madison Heights. The incinerator was closed by MDNR in July 1988 because it was not meeting air quality regulations.

SOCRRA expects to reopen the incinerator in 1993 and process approximately 535,000 cubic yards (575 tons per day) of refuse. SOCRRA anticipates some relationship with the County's landfill system and plans to operate their own MRF at their transfer station.

Waste Stream Analysis

SOCRRA plans to process approximately 178,000 tons per year at the waste-to-energy facility[20] and to compost 93,000 cubic yards (31,000 tons) per year of leaves and grass by 1995. Currently, a project is underway where grass is being collected separately and introduced into the composting operation.

When the waste-to-energy facility begins operation, SOCRRA plans to recover 40 tons per day of ferrous and non-ferrous metals.

20/ A summary of waste processed by SOCRRA in the past is as follows:

	Waste Quantity (tons/year)[a]
Solid Waste Received[b]	230,000
Leaves/Grass Composted[b]	20,000
Solid Waste Incinerated[b]	150,000
By-pass Solid Waste (disposed at SOCRRA landfill)[b]	60,000
Ash Generated at Incinerator[c]	94,000[d]
Metals Recovered from Ash[c]	13,000 - 15,000

[a]Quantities as reported by SOCRRA.
[b](tons/year) x2 = cubic yards/year
[c]tons/year = cubic yards/year (approximately)
[d]Includes some water weight.

SOCRRA operated a back-end metals recovery system at their former facility as well. This separation produced raw scrap material that was transported by the Huron Valley Steel Corporation to their secondary metals processing plant in Belleville, Michigan.[21]

3.3.4 GENERAL MOTORS SHRED/BURN FACILITY

Facility Description

The General Motors (GM) waste processing facility is located at the Truck and Bus Division on South Boulevard and Opdyke in Pontiac. The facility produces refuse derived fuel (RDF) to supplement its primary fuel source, coal, in two fuel boilers. The energy produced is harnessed as steam (350,000 lb/hour) and used to heat the building, to cool the building, and to provide power.

The facility is equipped with two wet scrubbers, one on each of the boilers, and complies with its permitted emissions standards. Prior to being burned in the boilers, the refuse is shredded and hammered, and segregated using air density separation. Metals are removed through magnetic separation, and large combustibles are recycled through the system.

21/ The annual tonnages and revenue generated by SOCRRA's metal recycling operations were as follows:

Fiscal Year	Quantity (Tons)[a]	Revenue ($)	Revenue Per Ton ($)
1983/84	12,523	100,478	8.02
1984/85[b]	8,763	77,483	8.84
1985/86	13,696	85,598	6.25
1986/87	13,693	85,583	6.25

[a]tons = cubic yards (approximately)
[b]Only one furnace was in operation for a 5-month period.

Waste Stream Analysis

The GM waste facility accepts only wood, paper, and corrugated materials from manufacturing operations. Since 1975, the facility has processed 324,240 tons of refuse, comparable to 2,806,500 cubic yards of landfill space.[22] Waste is accepted from sources outside GM and Oakland County to provide sufficient refuse to burn.

The ash generated during the incineration process results from the combustion of refuse and coal. This ash is currently disposed in the Collier Road Landfill.

Expansion Plans

GM currently has no plans to expand this facility. Equipment will be upgraded as required through normal wear.

Litigation and Other Concerns

No complaints have been filed since the waste processing facility began operations in 1975.

22/ The volume of waste received at the GM facility from 1985-87 is as follows:

	(Tons/year)		
	1985	1986	1987
Total Processed Waste[a]	29,606	30,746	37,511
Out of County Waste[a]	622	615	600
Ash Generated[b]	4,200	4,500	5,100

[a](Tons/year) x 3 = cubic yards/year (approximately)

[b]Ash generated is a mixture of coal ash and refuse ash. The amounts listed above are estimates of refuse ash only, based on 0.75 ton of ash/cubic yard.

3.4 WASTE IMPORT AND EXPORT

To gain a more complete understanding of total waste being generated and disposed in the County, the import and export of all waste types were estimated. Based on the information provided in the following sections, it appears that the County is importing a net amount of 394,200 cubic yards per year (540 tons per day) of residential, commercial, and industrial waste, and exporting 360,700 cubic yards per year (990 tons per day) of construction/demolition and industrial special waste.[23] Since landfill capacity is based on volume and not tonnage, the County is importing and exporting approximately equally.

Note that these import/export figures do not include SOCRRA's waste, which has been directed to private sector landfills in and out of the County since the closure of the SOCRRA incinerator in 1988.

3.4.1 RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL WASTE

The import of residential, commercial, and industrial waste was calculated based on estimations reported by the County landfill operators (see Table 3.3-2). According to these sources, 685,800 cubic yards per year (940 tons per day) of residential, commercial, and industrial waste are imported from outside the County.

The export of residential, commercial, and industrial waste was estimated based on phone surveys of certain border communities that generate a relatively large quantity of waste and on a questionnaire sent to all communities to determine where they send their waste. Communities located near the County borders were assumed more likely to export waste than other communities. Using information obtained from these sources, a 292,000 cubic

23/ The variation in the conversion ratio results from the fact that residential, commercial and industrial waste assumes that the waste is inplace in the landfill with a conversion factor of 2 cubic yards/ton; construction/demolition and industrial special waste assumes a conversion factor of 1 cubic yard/ton.

yards per year (400 tons per day) export rate was estimated, exclusive of the waste exported by SOCRRA.

Based on these numbers, the net result of residential, commercial, and industrial waste import/export in the County is the net import of 394,200 cubic yards per year (540 tons per day) of waste, excluding Oakland County's construction/demolition and industrial special waste export.

3.4.2 CONSTRUCTION/DEMOLITION AND INDUSTRIAL SPECIAL WASTE

A considerable amount of construction/demolition and industrial special waste is generated within the County. Recycling of certain materials such as concrete, scrap pallets, metals, and plastics is prevalent in the industries, although other materials must be landfilled or incinerated.

Currently, Eagle Valley, Wayne Disposal--Oakland, Waterford Hills, and Collier Road landfills report accepting "other" wastes, which would include construction/demolition and industrial special wastes. Additionally, the GM incinerator reports processing combustible industrial special wastes, such as pallets.

Some of the construction/demolition and industrial special waste stream, such as concrete, fly ash and foundry sand, can be disposed of in a Type III landfill. However, the County has no landfills operating as Type III facilities (the landfills mentioned above accept mostly Type II wastes).

Neighboring counties--Wayne, Washtenaw, and Macomb--have Type II and III landfills that are probably accepting construction/demolition and industrial special waste from Oakland County. Wayne Disposal's Type II landfill located

in Belleville, Wayne County reports accepting 82,000 cubic yards per year (82,000 tons per year) of construction/demolition and industrial special wastes from the County.[24]

An estimated 360,700 cubic yards per year (990 tons per day) of Oakland County construction/demolition and industrial special waste is disposed at out-of-county facilities.[25]

24/ The estimated quantities of construction/demolition and industrial special waste generated and disposed in the County in 1987 are as follows:

	(Tons/year)[a]
Construction/Demolition Waste Generation[b]	139,400
Industrial Special Waste Generation[b]	410,000
"Other" Waste Accepted at Oakland County Landfills[c]	78,800
Waste Recycled[d]	109,900
Estimated Waste Disposed at Out-of-County Landfills	360,700

[a] Tons/year = cubic yards/year (approximately)

[b] Refer to Section 3.1 of this Plan for a discussion of the methodology used to estimate these generation rates.

[c] As reported by Eagle Valley, Wayne Disposal--Oakland and Collier Road landfills for 1987.

[d] Assuming 20 percent of the construction/demolition and industrial special waste is recycled through reuse or incineration at GM.

25/ The industrial special waste generation rates used to estimate this quantity are based on a 1980 survey (Oakland County, Michigan, Solid Waste Management Planning, Phase 1A, Camp Dresser & McKee) and may be high because these rates do not reflect recycling or source reduction practices that companies may have initiated recently. Representative industries were contacted to verify these rates, but the results received could not substantially confirm or refute the 1980 generation rates. A detailed survey of Oakland County industries should be conducted to estimate up-to-date industrial special waste generation rates and to identify the disposal sites accepting this waste.

3.5 WASTEWATER TREATMENT SLUDGE

Two large wastewater treatment plants and a host of smaller units operate within the County. The smaller treatment plants are in trailer parks, rural subdivisions, and apartment complexes. All of these facilities dispose of their sludge in the City of Detroit sewer system.[26]

Five community-operated wastewater treatment facilities are located in the County. Sludge at each of them is treated differently. None delivers sludge to the Detroit sewer system, but some of the communities use land application or land injection to dispose of the sludge. Land application of sludge is similar to application of solid or semi-solid fertilizers, lime, or animal manure. The sludge can be spread with bulldozers, loaders, or graders and then plowed or disked into the ground. Land injection of sludge involves cutting a furrow, and covering the sludge and furrow -- all in one operation. Modifications of this process may include methods in which sludge is injected beneath the soil surface or incorporated by use of a disk.

Previously, the City of Rochester used land application and landfilling to dispose of its sludge. Beginning in December 1987, a centrifuge was implemented to remove liquids from the sludge. This centrifuge is still operating and the dry sludge is placed in the Wayne Disposal--Oakland landfill (100 tons/month). Rochester hopes to use land application to dispose of the dry sludge in the future, but no permits have been granted yet.

26/ The annual volumes (in gallons) delivered to the Detroit sewer system are listed below:

	1986	1987	1988 (Jan. - June)
Walled Lake/Novi	3,916,400	5,323,000	2,044,900
Wixom	3,329,750	3,790,200	1,684,800
All Other	2,645,000	1,684,800	856,500

The City of Pontiac incinerates all of its sludge at its wastewater treatment plant. In the 1987 fiscal year, 24,126 tons of sludge were burned. The incinerator ash (6,000 cubic yards) was disposed at the Eagle Valley landfill as Type II waste.

The City of South Lyon has used land application to dispose of its sludge in the past and plans to continue this disposal method. Previously, Washtenaw County accepted 200 dry cubic yards of sludge annually. A new site will be used in either Washtenaw, Livingston, or Oakland County for future land application. However, the City has not yet made its final site selection.

The Village of Holly land injects its sludge, according to its MDNR Program of Effective Residuals Management (PERM) Permit. In 1987, 126 dry tons were disposed using this method.

The Village of Milford has a new treatment plant that has recently begun operations. All sludge will be dried and disposed through land application. An estimated 128 tons annually will be disposed at a site in either Oakland or Livingston County. Any wet sludges will be landfilled at the Lyon Land Development Sanitary Landfill in Oakland County.

In summary, the quantities of sludge generated in each of these communities is:

Community	Quantity of Sludge (dry)[a]
City of Rochester	1200 tons/year
City of Pontiac	24,126 tons/year
City of South Lyon	200 cubic yards/year
Village of Holly	126 tons/year
Village of Milford	128 tons/year

[a]Quantities as reported by wastewater treatment plant operators.

TABLE 3.1-1
WASTE GENERATION RATES FROM OTHER RECENT STUDIES/PLANS

Location and Reference	Year of Study	Estimated Waste Generation by Source				
		Residential	Commercial	Industrial	Institutional	Total
Other Michigan Counties						
Macomb Co., MI (MDNR Survey, 1987; included Roseville, East Detroit and St. Clair Shores)	1987	Combined, 3.9 PCD[a]				
LaPeer Co., MI (MDNR Survey, 1987)	1987	Combined, 2.7 PCD				
Chippewa Co., MI (MDNR Survey, 1987)	1987	Combined, 2.2 PCD				
Delta Co., MI (MDNR Survey, 1987)	1987	Combined, 2.9 PCD				
Marquette Co., MI (MDNR Survey, 1987)	1987					
City of Marquette		Combined, 2.9 PCD				
Rural Areas		Combined, 2.3 PCD				
Kent Co., MI (Bond Official Statement, 1987)	1984					
Kent Co., MI (Act 641 Plan, 1983)	1980	2.30 PCD	1.25 PCD	13 Different PED[b] Rates	Not Shown Separately	5.54 PCD
	1985	2.35 PCD	1.27 PCD			5.54 PCD
	1990	2.39 PCD	1.30 PCD			5.62 PCD
	1995	2.43 PCD	1.33 PCD			5.69 PCD
	2000	2.48 PCD	1.35 PCD			4.82 PCD

[a]PCD = Pounds per capita per day
[b]PED = Pounds per employee per day

TABLE 3.1-1 (Continued)
WASTE GENERATION RATES FROM OTHER RECENT STUDIES/PLANS

Location and Reference	Year of Study	Estimated Waste Generation by Source				
		Residential	Commercial	Industrial	Institutional	Total
Wayne Co., MI (Act 641 Plan, 1984)	1980	2.6 PCD[a]	5.8 PED[b]	Regular = 10.6 PED; Special = 20.5 PED	Not Shown Separately	7.5 PCD
Washtenaw Co., MI (Act 641 Plan, 1982)	1980	2.62 PED	5.75 PED 2.0 PCD	10.2 PED (3.5 PCD)	Included in commercial	8.1 PCD
Oakland County Communities						
S.E. Oakland Co. (SOCIA, 1988)	7/86-6/87	Combined, 3.61 PCD				
City of Pontiac, MI (San. Dept., 1988)	1985 1986	2.25 PCD 2.27 PCD	3.48 PCD 3.35 PCD	0.36 PCD 0.45 PCD		6.09 PCD 6.07 PCD
Madison Heights, MI	3/87-2/88	2.4 PCD	0.96 PCD			
Southfield, MI	7/86-6/87	3.00 PCD				
S.W. Oakland Co. (S.W. Oakland Co. Solid Waste Consortium, 1988)		3.24 PCD	3.68 PCD	1.65 PCD		
National Averages						
Nationwide (U.S. EPA, Subtitle D, Phase I Report, 1986)	1986	Combined, 3.0 PCD				

[a]PCD = Pounds per capita per day
[b]PED = Pounds per employee per day

TABLE 3.1-1 (Continued)
WASTE GENERATION RATES FROM OTHER RECENT STUDIES/PLANS

Location and Reference	Year of Study	Estimated Waste Generation by Source				
		Residential	Commercial	Industrial	Institutional	Total
Nationwide (National Solid Waste Management Association, 1985)	1985	Combined, 2.5 to 3.5 PCD				
Nationwide (U.S. EPA, Franklin Report, 1986)	1960	Combined, 2.32 PCD[a]				
	1965	Combined, 2.59 PCD				
	1970	Combined, 2.94 PCD				
	1975	Combined, 2.86 PCD				
	1980	Combined, 2.96 PCD				
	1981	Combined, 2.99 PCD				
	1982	Combined, 2.95 PCD				
	1983	Combined, 3.04 PCD				
	1984	Combined, 3.08 PCD				
Miscellaneous						
Miscellaneous Locations (U.S. EPA Study by Franklin Associates, 1985)						
Flint, MI		2.07 PCD				
Milwaukee, WI		2.23 PCD				
Racine, WI		2.31 PCD				
DuPage Co, IL (SW Plan, 1987)	1985	2.1 PCD	1.7 PCD	1.0 PCD; Construction/ Demolition = 0.7 PCD		5.5 PCD

[a]PCD = Pounds per capita per day

TABLE 3.1-1 (Continued)
WASTE GENERATION RATES FROM OTHER RECENT STUDIES/PLANS

Location and Reference	Year of Study	Estimated Waste Generation by Source				
		Residential	Commercial	Industrial	Institutional	Total
Champaign Co., IL (SW Plan, 1986)	1985	2.2 PCD[a]	8.2 PED[b]	5.0 PED	Hosp. = 10 PBD Univ. = 1.0 PSD	Urban = 3.84 PCD[c] Rural = 3.29 PCD[d]
Michigan Energy & Mat'ls Recovery State Plan	1978	2.9 PCD	5.75 PED	10.6 PED	3.25 PED	

[a]PCD = Pounds per capita per day
[b]PED = Pounds per employee per day
[c]PBD = Pounds per bed per day
[d]PSD = Pounds per student per day

TABLE 3.1-2

SUMMARY OF WASTE QUANTITIES RECEIVED BY THE SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY (SOCIA), 1987

Community	1987 Waste Generation (Tons)	Population[a] (1985)	Employment[a] (1985)	Employment/ Capita	No. Households[a] (1985)	Waste Generation Per Capita (lb/cap/day)[b]	Waste Generation Per Household (lb/hh/day)[c]
Berkley	12,996	18,756	4,231	0.23	6,685	3.80	10.65
Beverly Hills	8,162	11,349	1,566	0.14	3,988	3.94	11.21
Birmingham	23,049	23,881	14,807	0.62	9,053	5.29	13.95
Clawson	9,349	15,305	4,607	0.30	5,471	3.35	9.36
Ferndale	18,448	27,437	11,317	0.41	10,068	3.68	10.04
Hazel Park	14,137	20,961	4,527	0.22	7,300	3.70	10.61
Huntington Woods	4,895	6,980	782	0.11	2,451	3.84	10.94
Lathrup Village	3,511	4,579	2,289	0.50	1,587	4.20	12.12
Madison Heights	23,121	36,157	20,123	0.56	12,870	3.50	9.84
Oak Park	19,505	31,231	14,772	0.47	11,174	3.42	9.56
Pleasant Ridge	2,287	3,216	697	0.22	1,153	3.90	10.87
Royal Oak - City	48,694	74,828	24,898	0.33	28,376	3.57	9.40
Royal Oak - Twp	935	6,512	1,753	0.27	2,738	0.79	1.87
Troy	38,722	71,374	83,314	1.17	24,305	2.97	8.73
Subtotal	227,811	352,566	189,683	0.54	127,219	3.54	9.81
Others	4,763						
Total	232,574	352,566	189,683	0.54	127,219	3.61	10.02

[a] SEMCOG provided this data.
[b] LB/CAP/DAY = Pounds per capita per day.
[c] LB/HH/DAY = Pounds per household per day.

TABLE 3.1-3

QUANTITIES OF WASTE RECEIVED AT THE CITY OF PONTIAC
COLLIER ROAD LANDFILL (IN TONS)

Source	1985	1986
Residential	30,825	31,129
Commercial	47,707	45,874
Industrial	4,892	6,227
Other	185,783	92,607

TABLE 3.1-4
ESTIMATED COMMERCIAL/INDUSTRIAL
WASTE GENERATION RATE FOR SELECTED OAKLAND COUNTY COMMUNITIES

Municipality	Com/Ind Waste Gen. (tons/year)	Total Employment (1985)[a]	Com/Ind Generation Rate (lb/emp/day)
City of Pontiac	76,580[b]	71,226	5.89
Village of Holly	2,065[c]	2,309	4.90
Holly Township	634[c]	348	9.98
City of Ferndale	11,040[c]	11,504	5.26

[a]Data from SEMCOG, May 27, 1988.
[b]Data from City of Pontiac (1985). Includes Pontiac waste incinerated at GM incinerator (approximately 81 percent of total waste accepted in 1985).
[c]Data from The Analysis of Solid Waste Disposal Fee Structure for the Oakland County Solid Waste Management Plan, September 1987.

TABLE 3.1-5
INDUSTRIAL SPECIAL WASTE GENERATION RATES FOR OAKLAND COUNTY

Standard Industrial Classification		Principal Components of Waste	Approximate Density	Generation Rate
No.	Title		(lb/cu yd)	(tons/employee/year)
20	Food and Kindred Products	Wood	600	0.25
22	Textile Mill Products	Wood, rubber	500	1.18
23	Apparel and Other Finished Products	Leather scraps	300	1.64
25	Furniture, Wood	Plastics, wood	500	0.50
30	Rubber and Miscellaneous Plastic Products	Foam rubber, wood	500	2.59
31	Leather and Leather Products	Leather scraps	300	0.71
32	Stone, Clay, and Glass Products	Asbestos, cork, rubber, plastics, treated paper	300	1.82
33	Primary Metal Industries	Sand	2,295	83.00
34	Fabricated Metal Products	Wood, metal, plastics	600	0.22
35	Machinery (except electrical)	Wood, metal, plastics	600	0.80
36	Electrical	Wood, foam rubber, metal	600	0.72
37	Transportation Equipment	Wood, metal, plastics, incinerator ash	600	4.37
39	Miscellaneous Manufacturing	Wood, metal, plastics	600	1.54

SOURCE: Oakland County, Michigan: Solid Waste Management Planning, Phase 1A, Volume 1, Data Base, November 1980.

TABLE 3.1-6
POPULATION BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
MUNICIPAL SOLID WASTE BOARD						
Addison Township	4,376	5,441	6,506	7,571	8,636	9,701
Auburn Hills	15,022	16,526	18,031	19,535	21,039	22,543
Bloomfield Township	43,316	44,488	45,661	46,833	48,006	49,178
Brandon Township	8,710	10,712	12,715	14,717	16,720	18,723
Clarkston	1,186	1,156	1,127	1,097	1,067	1,037
Commerce Township	19,301	20,658	22,016	23,373	24,731	26,089
Groveland Township	4,273	5,353	6,434	7,514	8,595	9,676
Highland Township	17,534	20,630	23,726	26,822	29,918	33,014
Holly	5,066	5,365	5,665	5,964	6,263	6,562
Independence Township	21,106	23,600	26,095	28,589	31,083	33,577
Keego Harbor	3,344	3,224	3,105	2,985	2,866	2,747
Lake Angelus	352	365	378	391	404	417
Lake Orion	3,001	2,962	2,924	2,885	2,846	2,807
Lyon Township	9,429	10,611	11,793	12,975	14,157	15,339
Milford Township	5,510	5,944	6,379	6,813	7,247	7,681
Oakland Township	7,804	9,976	12,148	14,320	16,492	18,664
Orchard Lake	1,713	1,828	1,943	2,058	2,173	2,288
Orion Township	20,197	22,407	24,618	26,828	29,039	31,250
Oxford	2,959	2,919	2,880	2,840	2,800	2,760
Oxford Township	8,223	9,976	11,730	13,483	15,236	16,989
Rochester	8,353	8,606	8,860	9,113	9,366	9,619
Rochester Hills	47,075	54,123	61,172	68,220	75,268	82,316
Springfield Township	8,695	10,545	12,396	14,246	16,097	17,948
Sylvan Lake	2,078	2,060	2,043	2,025	2,008	1,991
Waterford Township	67,849	69,345	70,842	72,338	73,835	75,332
West Bloomfield Twp.	44,852	48,101	51,351	54,600	57,850	61,100
White Lake Township	22,698	24,703	26,709	28,714	30,719	32,724
Wixom	9,665	11,173	12,682	14,190	15,699	17,207
Wolverine Lake	5,090	5,069	5,048	5,027	5,006	4,985
Total MSWB	418,777	457,866	496,977	534,778	575,165	614,264
SOCRRA						
Berkley	18,756	18,279	17,802	17,325	16,848	16,371
Beverly Hills	11,350	11,317	11,285	11,252	11,220	11,187

TABLE 3.1-6
(Continued)
POPULATION BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Birmingham	23,882	23,337	22,793	22,248	21,704	21,159
Clawson	15,305	14,671	14,038	13,404	12,770	12,136
Ferndale	27,438	26,865	26,293	25,720	25,148	24,576
Hazel Park	20,962	20,364	19,767	19,169	18,572	17,975
Huntington Woods	6,980	6,834	6,689	6,543	6,397	6,251
Lathrup Village	4,579	4,687	4,796	4,904	5,012	5,120
Madison Heights	36,157	35,158	34,160	33,161	32,162	31,163
Oak Park	31,231	31,881	32,532	33,182	33,832	34,482
Pleasant Ridge	3,216	3,155	3,094	3,033	2,972	2,911
Royal Oak	74,828	73,339	71,851	70,362	68,873	67,384
Royal Oak Township	6,513	6,523	6,534	6,544	6,555	6,566
Troy	71,375	76,136	80,898	85,659	90,421	95,183
Total SOCRRA	352,572	352,546	352,532	352,506	352,486	352,464
CITY OF PONTIAC						
Pontiac	75,057	75,129	75,202	75,274	75,346	75,418
OTHER						
Bingham Farms	985	1,035	1,086	1,136	1,187	1,237
Bloomfield Hills	4,138	4,346	4,554	4,762	4,970	5,178
Farmington	11,691	11,814	11,938	12,061	12,185	12,308
Farmington Hills	62,562	67,311	72,061	76,810	81,560	86,310
Franklin	2,817	2,781	2,746	2,710	2,675	2,640
Holly Township	3,654	3,997	4,341	4,684	5,027	5,370
Leonard	397	392	387	382	377	372
Milford	5,269	5,354	5,440	5,525	5,610	5,695
Novi	25,531	28,671	31,812	34,952	38,093	41,233
Ortonville	1,307	1,309	1,312	1,314	1,317	1,319
Rose Township	4,641	5,803	6,966	8,128	9,290	10,452
South Lyon	5,760	6,210	6,660	7,110	7,560	8,010
Southfield	81,017	84,405	87,794	91,182	94,571	97,960
Walled Lake	5,654	5,734	5,815	5,895	5,975	6,055
Total OTHER	215,423	229,162	242,912	256,651	270,397	284,139
OAKLAND COUNTY	1,061,829	1,114,703	1,167,623	1,220,497	1,273,395	1,326,285

Source: SEMCOG Forecasts to 2010 for Use in Solid Waste Planning, May 1988.

TABLE 3.1-7
NUMBER OF HOUSEHOLDS BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
MUNICIPAL SOLID WASTE BOARD						
Addison Township	1,405	1,899	2,394	2,888	3,383	3,878
Auburn Hills	5,356	6,272	7,189	8,105	9,021	9,937
Bloomfield Township	14,857	15,892	16,927	17,962	18,997	20,032
Brandon Township	2,726	3,648	4,571	5,493	6,416	7,339
Clarkston	401	405	410	414	419	424
Commerce Township	6,321	7,147	7,974	8,800	9,627	10,453
Groveland Township	1,340	1,822	2,305	2,787	3,270	3,752
Highland Township	5,506	7,030	8,555	10,079	11,604	13,129
Holly	1,673	1,891	2,110	2,328	2,546	2,764
Independence Township	6,715	8,031	9,347	10,663	11,979	13,295
Keego Harbor	1,276	1,285	1,295	1,304	1,313	1,322
Lake Angelus	132	135	139	142	146	150
Lake Orion	1,098	1,138	1,179	1,219	1,259	1,299
Lyon Township	3,268	4,097	4,927	5,756	6,586	7,415
Milford Township	1,770	1,992	2,215	2,437	2,659	2,881
Oakland Township	2,432	3,315	4,199	5,082	5,966	6,849
Orchard Lake	573	627	681	735	789	843
Orion Township	6,701	8,041	9,382	10,722	12,062	13,402
Oxford	1,067	1,091	1,116	1,140	1,165	1,189
Oxford Township	2,652	3,555	4,459	5,362	6,265	7,168
Rochester	3,321	3,591	3,861	4,131	4,401	4,671
Rochester Hills (a)	15,841	18,981	22,122	25,262	28,403	31,544
Springfield Township	2,745	3,658	4,572	5,485	6,399	7,313
Sylvan Lake	811	811	811	811	811	811
Waterford Township	23,660	25,728	27,797	29,865	31,933	34,001
West Bloomfield Twp.	14,417	16,649	18,882	21,114	23,347	25,579
White Lake Township	7,410	8,743	10,077	11,410	12,744	14,077
Wixom (b)	3,877	4,854	5,832	6,809	7,787	8,764
Wolverine Lake	1,634	1,715	1,797	1,878	1,960	2,042
Total MSWB	140,974	164,043	187,114	210,183	233,253	256,323
SOCRRA						
Berkley	6,686	6,697	6,709	6,720	6,732	6,743
Beverly Hills	3,988	4,068	4,148	4,228	4,308	4,388

TABLE 3.1-7
(Continued)
NUMBER OF HOUSEHOLDS BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Birmingham	9,054	9,239	9,425	9,610	9,796	9,981
Clawson	5,472	5,440	5,409	5,377	5,346	5,314
Ferndale	10,068	10,203	10,339	10,474	10,609	10,744
Hazel Park	7,301	7,432	7,564	7,695	7,827	7,958
Huntington Woods	2,451	2,451	2,451	2,451	2,451	2,451
Lathrup Village	1,587	1,658	1,730	1,801	1,872	1,943
Madison Heights	12,871	13,104	13,338	13,571	13,805	14,039
Oak Park	11,175	11,390	11,606	11,821	12,037	12,252
Pleasant Ridge	1,153	1,157	1,162	1,166	1,170	1,174
Royal Oak	28,377	28,708	29,040	29,371	29,703	30,035
Royal Oak Township	2,739	2,846	2,954	3,061	3,169	3,276
Troy	24,305	27,549	30,793	34,037	37,281	40,525
Total SOCRRA	127,222	131,942	136,663	141,383	146,103	150,823
CITY OF PONTIAC						
Pontiac	25,819	27,336	28,853	30,370	31,887	33,404
OTHER						
Bingham Farms	341	363	386	408	431	453
Bloomfield Hills	1,403	1,536	1,670	1,803	1,936	2,069
Farmington	4,590	4,810	5,031	5,251	5,472	5,693
Farmington Hills	22,295	25,245	28,195	31,145	34,095	37,045
Franklin	980	983	986	989	992	995
Holly Township	1,239	1,447	1,655	1,863	2,071	2,279
Leonard	127	131	135	139	143	147
Milford	1,746	1,876	2,006	2,136	2,266	2,396
Novi	8,887	10,783	12,680	14,576	16,472	18,368
Ortonville	414	445	477	508	540	572
Rose Township	1,438	1,961	2,485	3,008	3,532	4,056
South Lyon	2,087	2,418	2,750	3,081	3,412	3,743
Southfield	31,119	33,737	36,356	38,974	41,593	44,212
Walled Lake	1,991	2,132	2,273	2,414	2,555	2,696
Total OTHER	78,653	87,867	97,081	106,295	115,510	124,724
OAKLAND COUNTY	372,667	411,188	449,710	488,231	526,753	565,274

Source: SEMCOG Forecasts to 2010 for Use in Solid Waste Planning, May, 1988.

TABLE 3.1-8
EMPLOYMENT BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
MUNICIPAL SOLID WASTE BOARD						
Addison Township						
Industrial	83	85	87	90	92	94
Commercial	232	288	345	401	458	514
Auburn Hills						
Industrial	2,133	3,388	4,643	5,898	7,154	8,409
Commercial	8,316	14,431	20,546	26,661	32,777	38,892
Bloomfield Township						
Industrial	1,016	1,014	1,012	1,011	1,009	1,007
Commercial	8,403	9,477	10,551	11,626	12,700	13,774
Brandon Township						
Industrial	271	281	291	301	311	321
Commercial	470	526	582	638	694	750
Clarkston						
Industrial	4	4	4	3	3	3
Commercial	1,801	1,734	1,668	1,601	1,535	1,468
Commerce Township						
Industrial	2,726	2,741	2,756	2,770	2,785	2,800
Commercial	3,283	3,514	3,745	3,977	4,208	4,439
Groveland Township						
Industrial	33	34	35	37	38	39
Commercial	54	57	60	64	67	70
Highland Township						
Industrial	829	869	910	950	991	1,031
Commercial	1,637	1,836	2,035	2,234	2,433	2,632
Holly						
Industrial	450	473	496	518	541	564
Commercial	1,739	2,001	2,263	2,526	2,788	3,050

TABLE 3.1-8
(Continued)
EMPLOYMENT BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Independence Township						
Industrial	457	455	453	451	449	447
Commercial	2,445	2,662	2,879	3,097	3,314	3,531
Keego Harbor						
Industrial	51	52	54	55	57	58
Commercial	539	580	621	662	703	744
Lake Angelus						
Industrial	13	13	13	14	14	14
Commercial	0	0	0	0	0	0
Lake Orion						
Industrial	373	384	395	406	417	428
Commercial	1,373	1,523	1,673	1,822	1,972	2,122
Lyon Township						
Industrial	975	960	945	931	916	901
Commercial	952	1,008	1,064	1,119	1,175	1,231
Milford Township						
Industrial	2,609	2,757	2,836	2,914	2,993	3,072
Commercial	1,643	1,820	2,183	2,547	2,911	3,275
Oakland Township						
Industrial	225	235	245	255	265	275
Commercial	378	423	468	512	557	602
Orchard Lake						
Industrial	7	7	8	8	9	9
Commercial	157	180	203	227	250	273
Orion Township						
Industrial	3,695	3,833	3,971	4,110	4,248	4,386
Commercial	3,688	4,005	4,322	4,639	4,956	5,273
Oxford						
Industrial	609	627	646	664	683	701
Commercial	944	1,075	1,206	1,338	1,469	1,600
Oxford Township						
Industrial	1,639	1,705	1,771	1,838	1,904	1,970
Commercial	602	691	781	870	960	1,049

TABLE 3.1-8
(Continued)
EMPLOYMENT BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Rochester						
Industrial	2,388	2,210	2,032	1,855	1,677	1,499
Commercial	7,349	7,195	7,041	6,887	6,733	6,579
Rochester Hills						
Industrial	1,739	2,317	2,895	3,474	4,052	4,630
Commercial	7,014	9,683	12,352	15,021	17,690	20,359
Springfield Township						
Industrial	306	323	341	358	376	393
Commercial	852	962	1,072	1,183	1,293	1,403
Sylvan Lake						
Industrial	66	69	72	74	77	80
Commercial	287	309	331	352	374	396
Waterford Township						
Industrial	1,025	1,026	1,027	1,027	1,028	1,029
Commercial	8,993	9,467	9,942	10,416	10,891	11,365
West Bloomfield Twp.						
Industrial	1,017	1,038	1,060	1,081	1,103	1,124
Commercial	6,158	7,106	8,055	9,003	9,952	10,900
White Lake Township						
Industrial	507	498	490	481	473	464
Commercial	2,211	2,341	2,471	2,601	2,731	2,861
Wixom						
Industrial	3,249	3,366	3,484	3,601	3,719	3,836
Commercial	958	1,059	1,160	1,262	1,363	1,464
Wolverine Lake						
Industrial	0	0	0	0	0	0
Commercial	43	49	55	62	68	74
MSWB TOTAL	101,007	116,766	132,643	148,523	164,397	180,274
Industrial total	28,490	30,764	32,970	35,175	37,379	39,584
Commercial total	72,517	86,002	99,673	113,348	127,018	140,690
SOUTHEASTERN OAKLAND COUNTY RESOURCE RECOVERY AUTHORITY						
Berkley						
Industrial	833	779	725	671	617	563
Commercial	3,398	3,622	3,847	4,071	4,296	4,520

TABLE 3.1-8
(Continued)
EMPLOYMENT BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Beverly Hills						
Industrial	280	276	272	267	263	259
Commercial	1,287	1,325	1,363	1,400	1,438	1,476
Birmingham						
Industrial	1,603	1,490	1,377	1,263	1,150	1,037
Commercial	13,206	13,421	13,637	13,852	14,068	14,283
Clawson						
Industrial	982	920	858	796	734	672
Commercial	3,625	3,575	3,525	3,476	3,426	3,376
Ferndale						
Industrial	5,305	5,203	5,102	5,000	4,899	4,797
Commercial	6,013	6,540	7,067	7,594	8,121	8,648
Hazel Park						
Industrial	1,432	1,353	1,274	1,194	1,115	1,036
Commercial	3,096	3,064	3,032	2,999	2,967	2,935
Huntington Woods						
Industrial	72	64	56	48	40	32
Commercial	711	701	691	682	672	662
Lathrup Village						
Industrial	437	417	397	376	356	336
Commercial	1,853	1,876	1,899	1,923	1,946	1,969
Madison Heights						
Industrial	9,094	9,113	9,132	9,150	9,169	9,188
Commercial	11,030	11,418	11,807	12,195	12,584	12,972
Oak Park						
Industrial	4,173	4,163	4,153	4,144	4,134	4,124
Commercial	10,599	10,828	11,057	11,286	11,515	11,744
Pleasant Ridge						
Industrial	210	195	181	166	152	137
Commercial	488	494	500	507	513	519
Royal Oak						
Industrial	3,644	3,599	3,555	3,510	3,466	3,421
Commercial	21,255	21,467	21,679	21,891	22,103	22,315

TABLE 3.1-8
(Continued)
EMPLOYMENT BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Royal Oak Township						
Industrial	286	299	312	324	337	350
Commercial	1,466	1,656	1,846	2,035	2,225	2,415
Troy						
Industrial	22,907	23,857	24,807	25,757	26,706	27,656
Commercial	56,850	65,283	73,716	82,150	90,583	99,016
SOCRRA TOTAL	186,133	196,998	207,863	218,727	229,593	240,458
Industrial total	51,258	51,728	52,198	52,666	53,138	53,608
Commercial total	134,875	145,270	155,665	166,061	176,455	186,850
CITY OF PONTIAC						
Pontiac TOTAL	71,596	73,046	74,497	75,948	77,398	78,848
Industrial total	38,987	39,467	39,947	40,427	40,906	41,386
Commercial total	32,608	33,579	34,550	35,521	36,491	37,462
OTHER						
Bingham Farms						
Industrial	128	136	144	151	159	167
Commercial	4,753	6,135	7,517	8,898	10,280	11,662
Bloomfield Hills						
Industrial	910	899	889	878	868	857
Commercial	7,052	7,701	8,350	8,999	9,648	10,297
Farmington						
Industrial	1,935	1,843	1,751	1,660	1,568	1,476
Commercial	6,444	6,483	6,522	6,560	6,599	6,638
Farmington Hills						
Industrial	7,745	9,221	10,697	12,173	13,648	15,124
Commercial	25,377	33,525	41,673	49,820	57,968	66,116
Franklin						
Industrial	56	58	60	62	64	66
Commercial	413	485	557	629	701	773
Holly Township						
Industrial	183	188	194	199	205	210
Commercial	157	175	194	212	231	249

TABLE 3.1-8
(Continued)
EMPLOYMENT BY CIVIL DIVISION

CIVIL DIVISION	1985	1990	1995	2000	2005	2010
Leonard						
Industrial	182	175	169	162	156	149
Commercial	42	42	42	43	43	43
Milford						
Industrial	358	376	394	413	431	449
Commercial	1,343	1,514	1,685	1,856	2,027	2,198
Novi						
Industrial	5,084	5,335	5,586	5,837	6,087	6,338
Commercial	10,733	12,052	13,372	14,691	16,011	17,330
Ortonville						
Industrial	10	9	8	7	6	5
Commercial	871	847	823	799	775	751
Rose Township						
Industrial	40	41	42	43	44	45
Commercial	73	77	81	86	90	94
South Lyon						
Industrial	185	184	183	182	181	180
Commercial	2,573	2,811	3,049	3,287	3,525	3,763
Southfield						
Industrial	15,647	15,737	15,827	15,918	16,008	16,098
Commercial	78,631	84,744	90,857	96,971	103,084	109,197
Walled Lake						
Industrial	2,068	2,190	2,312	2,433	2,555	2,677
Commercial	2,718	3,068	3,418	3,768	4,118	4,468
OTHER TOTAL	175,709	196,051	216,393	236,737	257,078	277,420
Industrial total	34,530	36,392	38,254	40,118	41,979	43,841
Commercial total	141,179	159,659	178,139	196,619	215,099	233,579
OAKLAND COUNTY TOTAL	534,443	613,625	631,395	679,935	729,118	775,205
Industrial total	153,265	158,351	163,369	168,386	173,402	178,419
Commercial total	381,179	424,510	468,027	511,549	555,063	598,581

Source: SEMCOG Forecasts to 2010 for Use in Solid Waste Planning, May, 1988.

TABLE 3.1-9
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
MUNICIPAL SOLID WASTE BOARD						
Addison Township						
Residential	2,316	2,880	3,443	4,007	4,571	5,134
Industrial	160	165	169	174	178	182
Commercial	243	302	362	421	480	539
Auburn Hills						
Residential	7,950	8,746	9,543	10,339	11,135	11,931
Industrial	4,130	6,560	8,991	11,420	13,852	16,283
Commercial	8,726	15,144	21,561	27,977	34,395	40,812
Bloomfield Township						
Residential	22,925	23,545	24,166	24,786	25,407	26,027
Industrial	1,967	1,963	1,960	1,958	1,953	1,950
Commercial	8,818	9,945	11,072	12,200	13,327	14,454
Brandon Township						
Residential	4,610	5,669	6,729	7,789	8,849	9,909
Industrial	525	544	563	583	602	622
Commercial	493	552	611	670	728	787
Clarkston						
Residential	628	612	596	581	565	549
Industrial	8	8	7	6	6	6
Commercial	1,889	1,820	1,750	1,680	1,610	1,540
Commerce Township						
Residential	10,215	10,933	11,652	12,370	13,089	13,808
Industrial	5,279	5,307	5,336	5,364	5,393	5,422
Commercial	3,445	3,688	3,930	4,173	4,416	4,658
Groveland Township						
Residential	2,261	2,833	3,405	3,977	4,549	5,121
Industrial	63	66	68	72	73	76
Commercial	56	60	63	67	70	73
Highland Township						
Residential	9,280	10,918	12,557	14,196	15,834	17,473
Industrial	1,604	1,683	1,761	1,840	1,918	1,996
Commercial	1,718	1,927	2,135	2,344	2,553	2,762

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Holly						
Residential	2,681	2,839	2,998	3,156	3,315	3,473
Industrial	872	916	960	1,003	1,048	1,092
Commercial	1,825	2,100	2,375	2,651	2,925	3,201
Independence Township						
Residential	11,170	12,490	13,811	15,131	16,451	17,771
Industrial	885	881	877	873	869	866
Commercial	2,565	2,793	3,021	3,250	3,477	3,705
Keego Harbor						
Residential	1,770	1,706	1,643	1,580	1,517	1,454
Industrial	98	101	104	106	109	112
Commercial	566	609	652	695	738	781
Lake Angelus						
Residential	186	193	200	207	214	221
Industrial	25	25	26	27	27	27
Commercial	0	0	0	0	0	0
Lake Orion						
Residential	1,588	1,568	1,548	1,527	1,506	1,486
Industrial	722	744	765	786	807	829
Commercial	1,441	1,598	1,755	1,912	2,070	2,227
Lyon Township						
Residential	4,990	5,616	6,241	6,867	7,493	8,118
Industrial	1,887	1,859	1,830	1,803	1,773	1,745
Commercial	999	1,058	1,116	1,174	1,233	1,292
Milford Township						
Residential	2,916	3,146	3,376	3,606	3,835	4,065
Industrial	5,052	5,338	5,491	5,642	5,795	5,948
Commercial	1,724	1,910	2,291	2,673	3,055	3,437
Oakland Township						
Residential	4,130	5,280	6,429	7,579	8,728	9,878
Industrial	436	455	474	494	513	532
Commercial	397	444	491	537	585	632
Orchard Lake						
Residential	907	967	1,028	1,089	1,150	1,211
Industrial	14	14	15	15	17	17
Commercial	165	189	213	238	262	286

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Orion Township						
Residential	10,689	11,859	13,029	14,199	15,369	16,539
Industrial	7,154	7,422	7,690	7,958	8,225	8,493
Commercial	3,870	4,203	4,535	4,868	5,201	5,533
Oxford						
Residential	1,566	1,545	1,524	1,503	1,482	1,461
Industrial	1,178	1,214	1,250	1,286	1,322	1,357
Commercial	990	1,128	1,266	1,404	1,541	1,679
Oxford Township						
Residential	4,352	5,280	6,208	7,136	8,064	8,991
Industrial	3,173	3,301	3,430	3,559	3,686	3,815
Commercial	631	725	819	913	1,007	1,101
Rochester						
Residential	4,421	4,555	4,689	4,823	4,957	5,091
Industrial	4,623	4,279	3,935	3,592	3,247	2,903
Commercial	7,712	7,550	7,389	7,227	7,065	6,904
Rochester Hills						
Residential	24,914	28,645	32,375	36,105	39,836	43,566
Industrial	3,367	4,486	5,606	6,727	7,846	8,965
Commercial	7,360	10,161	12,962	15,763	18,563	21,364
Springfield Township						
Residential	4,602	5,581	6,561	7,540	8,519	9,499
Industrial	592	625	659	693	727	761
Commercial	894	1,009	1,125	1,241	1,357	1,472
Sylvan Lake						
Residential	1,100	1,090	1,081	1,072	1,063	1,054
Industrial	128	134	139	143	150	155
Commercial	301	324	347	369	393	416
Waterford Township						
Residential	35,909	36,701	37,493	38,285	39,077	39,869
Industrial	1,985	1,987	1,988	1,989	1,991	1,992
Commercial	9,437	9,934	10,432	10,930	11,428	11,926
West Bloomfield Twp.						
Residential	23,738	25,457	27,178	28,897	30,617	32,337
Industrial	1,968	2,010	2,052	2,093	2,135	2,176
Commercial	6,462	7,457	8,452	9,448	10,443	11,438

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
White Lake Township						
Residential	12,013	13,074	14,136	15,197	16,258	17,319
Industrial	981	964	948	931	915	898
Commercial	2,320	2,457	2,593	2,729	2,866	3,002
Wixom						
Residential	5,115	5,913	6,712	7,510	8,309	9,107
Industrial	6,290	6,518	6,745	6,973	7,200	7,428
Commercial	1,005	1,111	1,218	1,324	1,430	1,536
Wolverine Lake						
Residential	2,694	2,683	2,672	2,661	2,649	2,638
Industrial	0	0	0	0	0	0
Commercial	45	51	58	65	71	78
Total generated by MSWB	353,000	392,000	432,000	471,000	509,000	550,000
Residential total	222,000	242,000	263,000	284,000	304,000	325,000
Industrial total	55,000	60,000	64,000	68,000	72,000	77,000
Commercial total	76,000	90,000	105,000	119,000	133,000	148,000
SOUTHEASTERN OAKLAND COUNTY RESOURCE RECOVERY AUTHORITY						
Berkley						
Residential	9,927	9,674	9,422	9,169	8,917	8,664
Industrial	1,613	1,508	1,404	1,299	1,195	1,090
Commercial	3,565	3,801	4,036	4,272	4,508	4,743
Beverly Hills						
Residential	6,007	5,990	5,973	5,955	5,938	5,921
Industrial	543	534	526	517	510	502
Commercial	1,351	1,390	1,430	1,469	1,509	1,549
Birmingham						
Residential	12,640	12,351	12,063	11,775	11,487	11,198
Industrial	3,104	2,885	2,666	2,446	2,227	2,008
Commercial	13,858	14,084	14,310	14,536	14,762	14,988
Clawson						
Residential	8,100	7,765	7,430	7,094	6,759	6,423
Industrial	1,901	1,781	1,661	1,541	1,421	1,301
Commercial	3,804	3,752	3,699	3,648	3,595	3,543

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Ferndale						
Residential	14,522	14,218	13,916	13,612	13,310	13,007
Industrial	10,271	10,075	9,878	9,682	9,485	9,289
Commercial	6,310	6,863	7,416	7,969	8,522	9,075
Hazel Park						
Residential	11,094	10,778	10,462	10,145	9,829	9,508
Industrial	2,773	2,620	2,466	2,312	2,159	2,006
Commercial	3,249	3,215	3,181	3,147	3,114	3,080
Huntington Woods						
Residential	3,694	3,617	3,540	3,463	3,386	3,308
Industrial	139	124	108	93	77	62
Commercial	746	736	725	716	705	695
Lathrup Village						
Residential	2,423	2,481	2,538	2,595	2,653	2,710
Industrial	847	807	768	728	690	651
Commercial	1,944	1,969	1,993	2,018	2,042	2,066
Madison Heights						
Residential	19,136	18,607	18,079	17,550	17,022	16,493
Industrial	17,609	17,646	17,682	17,717	17,755	17,791
Commercial	11,574	11,982	12,389	12,797	13,205	13,612
Oak Park						
Residential	16,529	16,873	17,218	17,562	17,906	18,250
Industrial	8,080	8,061	8,042	8,024	8,004	7,985
Commercial	11,122	11,363	11,603	11,843	12,084	12,324
Pleasant Ridge						
Residential	1,702	1,670	1,637	1,605	1,573	1,541
Industrial	406	378	350	321	293	265
Commercial	512	518	525	532	538	545
Royal Oak						
Residential	39,603	38,815	38,027	37,239	36,451	35,663
Industrial	7,055	6,969	6,883	6,797	6,710	6,624
Commercial	22,304	22,527	22,749	22,972	23,194	23,417
Royal Oak Township						
Residential	3,447	3,452	3,458	3,463	3,469	3,475
Industrial	554	579	604	627	653	678
Commercial	1,539	1,738	1,937	2,135	2,335	2,534

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Troy						
Residential	37,775	40,295	42,815	45,335	47,855	50,376
Industrial	44,356	46,195	48,034	49,874	51,712	53,551
Commercial	59,657	68,506	77,356	86,206	95,055	103,905
Total generated by SOCRRA	428,000	439,000	451,000	463,000	475,000	487,000
Residential total	187,000	187,000	187,000	187,000	187,000	187,000
Industrial total	99,000	100,000	101,000	102,000	103,000	104,000
Commercial total	142,000	152,000	163,000	174,000	185,000	196,000
CITY OF PONTIAC						
Total generated by Pontiac	149,000	151,000	153,000	155,000	157,000	159,000
Residential total	40,000	40,000	40,000	40,000	40,000	40,000
Industrial total	75,000	76,000	77,000	78,000	79,000	80,000
Commercial total	34,000	35,000	36,000	37,000	38,000	39,000
OTHER						
Bingham Farms						
Residential	521	548	575	601	628	655
Industrial	248	263	278	292	308	323
Commercial	4,988	6,438	7,888	9,337	10,788	12,238
Bloomfield Hills						
Residential	2,190	2,300	2,410	2,520	2,630	2,740
Industrial	1,761	1,741	1,720	1,700	1,680	1,659
Commercial	7,400	8,081	8,762	9,443	10,124	10,805
Farmington						
Residential	6,187	6,253	6,318	6,383	6,449	6,514
Industrial	3,746	3,569	3,391	3,214	3,036	2,858
Commercial	6,762	6,803	6,844	6,884	6,925	6,966
Farmington Hills						
Residential	33,111	35,624	38,138	40,652	43,166	45,680
Industrial	14,997	17,855	20,712	23,571	26,427	29,285
Commercial	26,630	35,180	43,730	52,280	60,830	69,380

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Franklin						
Residential	1,491	1,472	1,453	1,434	1,416	1,397
Industrial	108	112	116	120	124	128
Commercial	433	509	585	660	736	811
Holly Township						
Residential	1,934	2,115	2,297	2,479	2,661	2,842
Industrial	353	364	375	385	396	407
Commercial	164	184	203	222	242	261
Leonard						
Residential	210	207	205	202	200	197
Industrial	351	339	326	314	301	289
Commercial	44	44	44	45	45	45
Milford						
Residential	2,789	2,834	2,879	2,924	2,969	3,014
Industrial	693	728	763	800	834	869
Commercial	1,409	1,589	1,768	1,948	2,127	2,307
Novi						
Residential	13,512	15,174	16,837	18,498	20,161	21,823
Industrial	9,845	10,330	10,816	11,302	11,787	12,272
Commercial	11,262	12,647	14,032	15,416	16,801	18,186
Ortonville						
Residential	692	693	694	695	697	698
Industrial	19	17	15	14	12	10
Commercial	914	889	864	838	813	788
Rose Township						
Residential	2,456	3,071	3,687	4,302	4,917	5,532
Industrial	77	79	81	83	85	87
Commercial	76	81	85	90	94	99
South Lyon						
Residential	3,048	3,287	3,525	3,763	4,001	4,239
Industrial	358	356	354	352	350	349
Commercial	2,700	2,950	3,200	3,449	3,699	3,949
Southfield						
Residential	42,878	44,671	46,465	48,258	50,052	51,845
Industrial	30,297	30,472	30,647	30,822	30,996	31,171
Commercial	82,513	88,928	95,343	101,759	108,174	114,589

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-9
(continued)
Type II Solid Waste Generation by Subsystems
(tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Walled Lake						
Residential	2,992	3,035	3,078	3,120	3,162	3,205
Industrial	4,005	4,241	4,476	4,711	4,948	5,184
Commercial	2,852	3,219	3,587	3,954	4,321	4,689
Total generated by OTHERS	329,000	359,000	390,000	420,000	450,000	480,000
Residential total	114,000	121,000	129,000	136,000	143,000	150,000
Industrial total	67,000	70,000	74,000	78,000	81,000	85,000
Commercial total	148,000	168,000	187,000	206,000	226,000	245,000
Total generated within OAKLAND COUNTY	1,259,000	1,341,000	1,426,000	1,509,000	1,591,000	1,676,000
Residential total	563,000	590,000	619,000	647,000	674,000	702,000
Industrial total	296,000	306,000	316,000	326,000	335,000	346,000
Commercial total	400,000	445,000	491,000	536,000	582,000	628,000

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year

TABLE 3.1-10
CONSTRUCTION/DEMOLITION WASTE GENERATION
(Tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
MUNICIPAL SOLID WASTE BOARD						
Addison Township	559	695	831	967	1,103	1,239
Auburn Hills	1,919	2,111	2,303	2,496	2,688	2,880
Bloomfield Township	5,534	5,683	5,833	5,983	6,133	6,282
Brandon Township	1,113	1,368	1,624	1,880	2,136	2,392
Clarkston	152	148	144	140	136	132
Commerce Township	2,466	2,639	2,813	2,986	3,159	3,333
Groveland Township	546	684	822	960	1,098	1,236
Highland Township	2,240	2,635	3,031	3,427	3,822	4,218
Holly	647	685	724	762	800	838
Independence Township	2,696	3,015	3,334	3,652	3,971	4,289
Keego Harbor	427	412	397	381	366	351
Lake Angelus	45	47	48	50	52	53
Lake Orion	383	378	374	369	364	359
Lyon Township	1,205	1,356	1,507	1,658	1,809	1,960
Milford Township	704	759	815	870	926	981
Oakland Township	997	1,274	1,552	1,829	2,107	2,384
Orchard Lake	219	234	248	263	278	292
Orion Township	2,580	2,862	3,145	3,427	3,710	3,992
Oxford	378	373	368	363	358	353
Oxford Township	1,050	1,274	1,498	1,722	1,946	2,170
Rochester	1,067	1,099	1,132	1,164	1,197	1,229
Rochester Hills	6,014	6,914	7,815	8,715	9,615	10,516
Springfield Township	1,111	1,347	1,584	1,820	2,056	2,293
Sylvan Lake	265	263	261	259	257	254
Waterford Township	8,668	8,859	9,050	9,241	9,432	9,624
West Bloomfield Twp.	5,730	6,145	6,560	6,975	7,390	7,806
White Lake Township	2,900	3,156	3,412	3,668	3,924	4,180
Wixom	1,235	1,427	1,620	1,813	2,005	2,198
Wolverine Lake	650	648	645	642	640	637
Total MSWB	53,500	58,500	63,500	68,500	73,500	78,500
SOUTHEASTERN OAKLAND COUNTY RESOURCE RECOVERY AUTHORITY						
Berkley	2,396	2,335	2,274	2,213	2,152	2,091
Beverly Hills	1,450	1,446	1,442	1,437	1,433	1,429

[a]Tons/year = Cubic yards/year

TABLE 3.1-10
(continued)
CONSTRUCTION/DEMOLITION WASTE GENERATION
(Tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Birmingham	3,051	2,981	2,912	2,842	2,773	2,703
Clawson	1,955	1,874	1,793	1,712	1,631	1,550
Ferndale	3,505	3,432	3,359	3,286	3,213	3,140
Hazel Park	2,678	2,602	2,525	2,449	2,373	2,296
Huntington Woods	892	873	854	836	817	799
Lathrup Village	585	599	613	626	640	654
Madison Heights	4,619	4,491	4,364	4,236	4,109	3,981
Oak Park	3,990	4,073	4,156	4,239	4,322	4,405
Pleasant Ridge	411	403	395	387	380	372
Royal Oak	9,559	9,369	9,179	8,989	8,799	8,608
Royal Oak Township	832	833	835	836	837	839
Troy	9,118	9,726	10,335	10,943	11,551	12,160
Total SOCRRA	45,000	45,000	45,000	45,000	45,000	45,000
CITY OF PONTIAC						
Pontiac	9,600	9,600	9,600	9,600	9,600	9,600
OTHER						
Bingham Farms	126	132	139	145	152	158
Bloomfield Hills	529	555	582	608	635	661
Farmington	1,494	1,509	1,525	1,541	1,557	1,572
Farmington Hills	7,992	8,599	9,206	9,812	10,419	11,026
Franklin	360	355	351	346	342	337
Holly Township	467	511	554	598	642	686
Leonard	51	50	49	49	48	48
Milford	673	684	695	706	717	728
Novi	3,262	3,663	4,064	4,465	4,866	5,268
Ortonville	167	167	168	168	168	169
Rose Township	593	741	890	1,038	1,187	1,335
South Lyon	736	793	851	908	966	1,023

[a]Tons/year = Cubic yards/year

TABLE 3.1-10
(continued)
CONSTRUCTION/DEMOLITION WASTE GENERATION
(Tons/year)[a]

Civil Division	1985	1990	1995	2000	2005	2010
Southfield	10,350	10,783	11,216	11,649	12,081	12,514
Walled Lake	722	733	743	753	763	774
Total OTHERS	27,500	29,300	31,000	32,800	34,500	36,300
OAKLAND COUNTY	136,000	142,000	149,000	156,000	163,000	169,000

[a]Tons/year = Cubic yards/year

TABLE 3.1-11

COUNTY-WIDE INDUSTRIAL SPECIAL WASTE GENERATION

Source	Waste Generation, By Year (tons/year)[a]					
	1985	1990	1995	2000	2005	2010
Auto Manufacturing[b]	179,370	179,880	180,390	180,900	181,410	181,920
Other Manufacturing[c]	392,040	232,180[d]	240,620	249,260	258,080	266,900
Total	571,410	412,060	421,010	430,160	439,490	448,830

[a] Tons/year approximately equals cubic yards per year.
[b] SIC 37.
[c] SIC 20, 23, 25, 30-36, and 39.
[d] The reduction in this category from 1985 to 1990 reflects the decrease in industrial special waste disposed in the City of Pontiac Collier Road Landfill due to closings that are not reflected in SEMCOG's industrial employment statistics.

TABLE 3.1-12

SUMMARY OF WASTE GENERATION IN OAKLAND COUNTY

Source	Waste Generation by Year (tons/year)					
	1985	1990	1995	2000	2005	2010
Residential[a]	563,000	590,000	619,000	647,000	674,000	702,000
Commercial[a]	400,000	445,000	491,000	536,000	582,000	628,000
Industrial[a]	296,000	306,000	316,000	326,000	335,000	346,000
Constr/Demol[b,c]	136,000	142,000	149,000	156,000	163,000	169,000
Ind. Special[c,d]	571,000	412,000[e]	421,000	430,000	439,000	449,000
Total	1,966,000	1,895,000	1,996,000	2,095,000	2,193,000	2,294,000

[a] (Tons/year) x (3 cubic yards/ton) = cubic yards/year
[b] Const/Demol = Construction/Demolition
[c] (Tons/year) = (Cubic yards/year)
[d] Ind. Special = Industrial Special Wastes
[e] The reduction in this category from 1985 to 1990 reflects the decrease in industrial special waste disposed in the City of Pontiac Collier Road Landfill due to closings that are not reflected in SEMCOG's industrial employment statistics.

TABLE 3.1-13
GENERATION OF INDUSTRIAL SPECIAL
WASTES BY TWO-DIGIT SIC CODES, 1985

SIC	Type of Industry	1985 Employment	Waste Generation Rate (tons/emp/yr)[a]	1985 Waste Generation (tons/yr)[b]
20	Food and Kindred Products	803	0.25	200
23	Apparel	472	1.64	770
25	Furniture and Fixtures	491	0.50	250
30	Rubber and Misc Products	4,880	2.59	12,640
31	Leather and Leather Products	175[c]	0.71	120
32	Stone, Clay, Glass, and Concrete	1,250	1.82	2,280
33	Primary Metal	4,203	83.00	348,850
34	Fabricated Metal, except Transportation	11,796	0.22	2,600
35	Machinery, except Electrical	21,883	0.80	17,500
36	Electrical Equipment	6,995	0.72	5,000
37	Transportation Equipment	41,046	4.37	179,370
39	Miscellaneous Manufacturing	1,118	1.54	1,830
	TOTALS	95,112	6.01	571,410

[a] tons/emp/yr = tons per employee per year
[b] tons/yr = tons per year
[c] Estimated value.

SOURCES:

Employment values are from County Business Patterns, U.S. Bureau of Census, 1985.

Waste generation rates are from Phase 1A Data Base, Camp Dresser & McKee, Nov. 1980.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
FOR RESIDENTIAL WASTE

Civil Division	Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Cities						
	Auburn Hills	None	X	Wayne Disposal -- Oakland		Looking into municipal contract
	Berkley	Tringali/BFI/Waste Mgt.			X	
	Birmingham	Car Trucking			X	
	Bloomfield Hills	None	X	Unknown		
	Clawson	BFI			X	
	Farmington	BFI		Arbor Hills[a] or Lyon[b]		
	Farmington Hills	The Rubbish Co. (Laidlaw)		Lyon		
	Ferndale	The Rubbish Co. (Laidlaw)			X	
	Hazel Park	Tringali Sanitation			X	
	Huntington Woods	Laidlaw			X	

[a]Arbor Hills landfill is located in Washtenaw County at Napier and Six Mile Roads.
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
(Continued)

Civil Division	Waste Collected By: Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Cities						
Keego Harbor		BFI		Lyon[b]		
Lake Angelus		None	X	Unknown		
Lathrup Village		The Rubbish Co. (Laidlaw)			X	
Madison Heights	X	None			X	
Northville		Midwestern Sanitation		Arbor Hills[a]		
Novi		None	X	Arbor Hills or Lyon		16 Haulers
Oak Park		Tringali Sanitation			X	
Orchard Lake		The Rubbish Co. (Laidlaw)		Lyon		
Pleasant Ridge		The Rubbish Co. (Laidlaw)			X	
Pontiac	X	None		Collier Rd.		

[a]Arbor Hills landfill is located in Washtenaw County at Napier and Six Mile Roads.
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
(Continued)

Civil Division	Waste Collected By: Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Cities						
Rochester		BFI		Unknown		
Rochester Hills		None	X	Unknown		15 Haulers
Royal Oak		Laidlaw			X	
Southfield		Laidlaw		Arbor Hills[a] or Lyon[b]		
South Lyon		Duncan Disposal or BFI		Arbor Hills or Lyon		
Sylvan Lake		BFI		Lyon		
Troy		Tringali Sanitation			X	
Walled Lake		Henning Brothers		Lyon		
Wixom		The Rubbish Co. (Laidlaw)		Lyon		
Township						
Addison		None	X	Unknown		
Bloomfield		None	X	Unknown		

[a]Arbor Hills landfill is located in Washtenaw County at Napier and Six Mile Roads.
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
(Continued)

Civil Division	Waste Collected By: Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Townships						
Brandon		None	X	Unknown		Mult. Haulers
Commerce		Oakland Disposal	X	Unknown		About 25% by Municipal Cont.
Groveland		None	X	Genesee[c]		Mult. Haulers
Highland		None	X	Unknown		Mult. Haulers
Holly		None	X	Montrose/ Grand Blanc[d]		
Independence		None	X	Waterford Hills		Smith's/Moore's Disposal
Lyon		None	X	Lyon[b]		Mult. Haulers
Milford		None	X	Lyon		H & R Disposal
Novi		None	X	Unknown		BFI

[a]Arbor Hills landfill is located in Washtenaw County at Napier and Six Mile Roads.
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
(Continued)

Civil Division	Waste Collected By: Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Townships						
Oakland		None	X	Unknown		
Orion		None	X	Wayne Disp. - Oakland or Eagle Valley		
Oxford		None	X	Unknown		Bushman Disposal
Rose		None	X	Waterford Hills or Lyon[b]		Al's/H & R Disposal
Royal Oak		Laidlaw			X	
Southfield		None	X	Unknown		
Springfield		None	X	Unknown		
Waterford		None	X	Unknown		
West Bloomfield		None	X	Unknown		Multiple Haulers
White Lake		None	X	Unknown		Multiple Haulers

[a]Arbor Hills landfill is located in Washtenaw County at Napier and Six Mile Roads.
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
(Continued)

Civil Division	Waste Collected By: Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Villages						
Beverly Hills		The Rubbish Co.			X	
Bingham Farms		Car Trucking		Eagle Valley or Wayne Disp.-Oakland		
Clarkston		None	X	Unknown		Clarkston Disposal Smith's Disposal
Franklin		Oakland Disposal		Waterford Hills		
Holly		Pollard Disposal		Montrose[d]		
Lake Orion		Avon Disposal - BFI		Eagle Valley		
Leonard		Information Not Available				
Milford		Duncan Disposal		Lyon[b]		
Ortonville		None	X	Unknown		Multiple Haulers
Oxford		Richfield Disposal		Genesee[c]		

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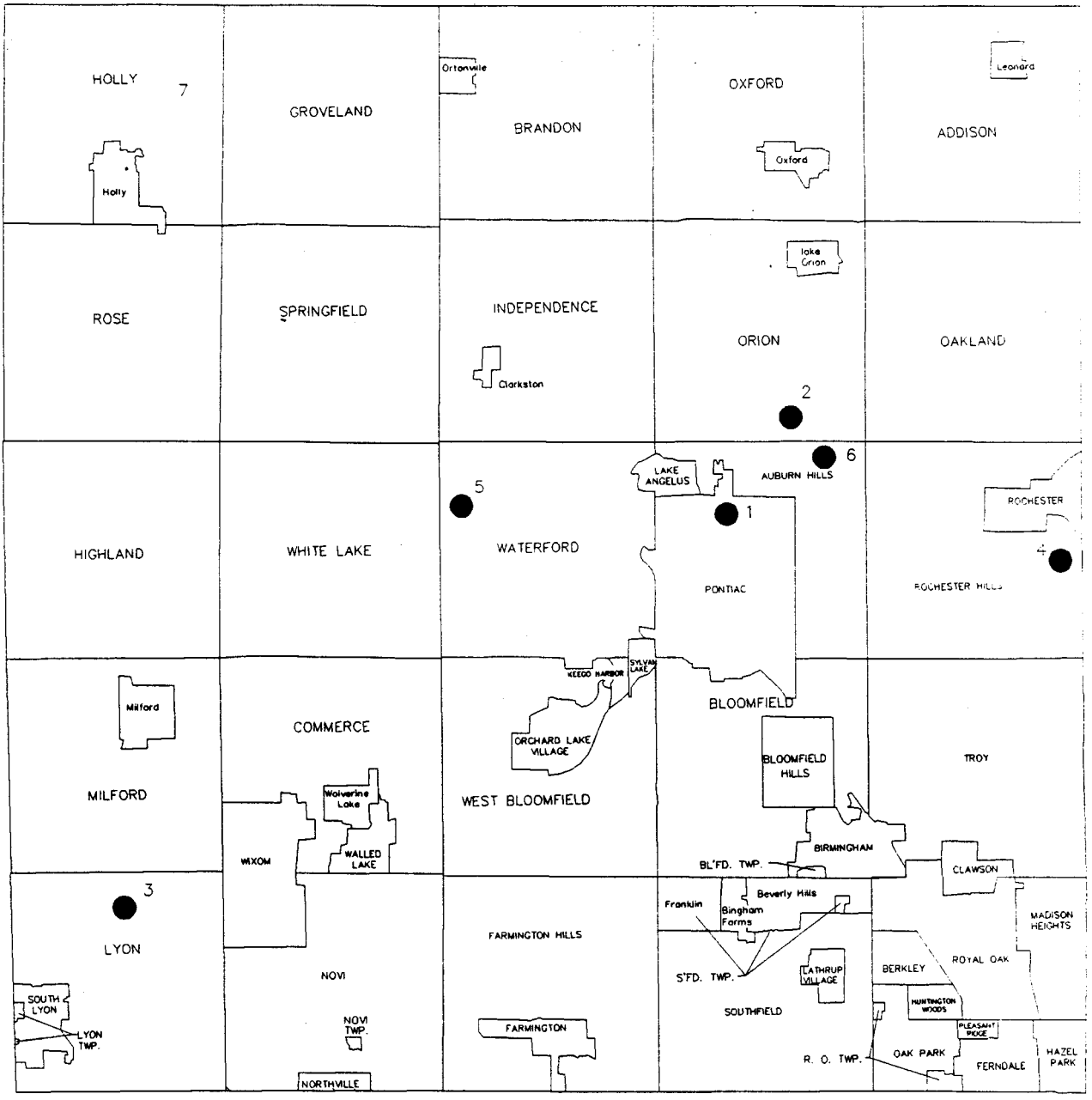
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.

TABLE 3.2-1
CURRENT SOLID WASTE DISPOSAL PRACTICES IN OAKLAND COUNTY
(Continued)

Civil Division	Waste Collected By: Municipality	Waste Collected By: Municipal Contract with Hauler	Waste Collected By: Individual Homeowner Contracts	Waste Disposed At: Landfill	Waste Disposed At: SOCIA	Comment
Villages						
Wolverine Lake		BFI		Arbor Hills[a]		

[a]Arbor Hills landfill is located in Washtenaw County at Napier and Six Mile Roads.
[b]Lyon Land Development Company Landfill.
[c]Genessee Landfill is located in eastern Genesee County north of the City of Davison.
[d]Montrose and Grand Blanc Landfills are located in Genesee County.



LEGEND

1 City of Pontiac Collier Road
2 Eagle Valley
3 Lyon Land Development Company
4 SOCRRA
5 Waterford Hills
6 Wayne Disposal – Oakland

CITY
Village
TOWNSHIP

FIGURE 3.3-1

LICENSED SANITARY LANDFILLS IN OAKLAND COUNTY, MICHIGAN

4.0 AVAILABLE WASTE REDUCTION/DISPOSAL ALTERNATIVES

To determine the most efficient and environmentally effective approach to solid waste management, the available solid waste disposal alternatives must be evaluated thoroughly. This Section presents the generic alternatives available at this time, Section 7 presents an analysis of the alternatives, and Section 8 presents the selected alternative.

The waste reduction and disposal alternatives available to the County are:

- o Source reduction (including reuse and waste reduction)
- o Source separation and recycling
- o Transfer stations
- o Land disposal
- o Mass burn systems (with energy recovery)
- o Refuse derived fuel (RDF) systems (with energy recovery)
- o Incineration without energy recovery
- o Baling
- o Shredding
- o Composting
- o Chipping

For each of these technologies, a brief description of the process is provided, the reliability of the system is described, potential environmental impacts are noted, political acceptability is discussed, general cost relationships are delineated, and the benefits derived from incorporating the technology into the County's overall system are addressed.

4.1 SOURCE REDUCTION

Source reduction assumes that many items that become solid waste need never be manufactured, or that they should contain fewer materials and/or have a longer product life. As a solid waste management technique, source reduction has lower environmental, social, and

economic costs than landfilling, source separation, or any form of waste-to-energy. Reducing waste at its source reduces the costs of solid waste collection, transport, processing, and disposal. Source reduction also eliminates energy use and pollution resulting from the processing of raw materials into final products and from the transporting of these products to the consumer. In addition to reducing waste, source reduction also would generate economic impacts on the producer, manufacturer and consumer. By reducing production, labor costs would also be reduced.

Eliminating all waste is impossible. However, a certain portion of solid waste is generated unnecessarily and could be eliminated without major changes in the standard of living.

The U.S. EPA has identified four approaches to achieving source reduction:[1]

- o reduced resource use per product
- o increased product lifetime
- o product reuse
- o decreased consumption of consumer products

4.1.1 REDUCED RESOURCE USE PER PRODUCT

This aspect focuses on the design of products and/or their packaging to minimize the quantities of materials used in manufacturing. It reduces both the amount of raw materials used and the energy required to process raw materials, fabricate the products, and transport them to the consumer. Obviously, not all products can be changed.

Some products for which decreased material use is possible are automobiles, newspapers, steel cans for beverages and other food, glass bottles, and corrugated packaging.

1/ The U.S. Environmental Protection Agency's Fourth Report to Congress, Waste-to-Energy and Waste Reduction.

4.1.2 INCREASED PRODUCT LIFETIME

Source reduction could also be achieved by increasing the length of time a consumer product remains in use. The greatest prospects for increased product lifetime are the so-called "consumer durables": appliances, televisions, radios, furniture, automobiles, and tires. Household appliances contribute about two percent of the solid waste stream, and tires contribute another two percent. Longer lasting automobiles may reduce solid waste, although most auto hulks are eventually recycled and never require disposal.

Product lifetime is difficult to control. Additionally, many consumer durable items are discarded that have potential usefulness for other consumers. If these items were available for reuse, the volumes of solid waste could be reduced.

4.1.3 PRODUCT REUSE

Source reduction could also be achieved by switching from single-use products or packages to multiple-use items. This concept, called product reuse, is different from source separation or recycling, because the product or package is reused without changing its original form (e.g., reusable packing boxes, returnable beverage containers, reusable plates and cutlery). Although the product or package is used without reprocessing or refabrication, secondary use is not necessarily the same as primary use (for example, waste tires used in breakwater construction).

This option for source reduction has, in most cases, taken the form of mandatory beverage container deposit legislation. Refillable beverage containers have been in use for many years. However, this approach could theoretically be applied to many types of reusable containers.

4.1.4 DECREASED CONSUMPTION OF CONSUMER PRODUCTS

The previous three approaches to source reduction involve a change in either the character of the product or in the number of times a product is reused. The fourth approach involves the reduction in the absolute number of consumer products used per person. The basis of this concept is that individuals could use less of certain products without affecting their standard of living. There is nothing technical or even particularly innovative about this option for source reduction. It is merely the logical elimination of some of the waste that is generated unnecessarily.

Consumption of consumer products could be decreased by activities such as:

- Gardens: Growing vegetables in gardens would reduce the amount of packaging made for these foods. Many individual homes already have gardens, and some cities such as Chicago, Ann Arbor, Grand Rapids, Kalamazoo, Lansing and Detroit have started "urban garden" programs that have been well received.

- Remodeling: A number of structurally sound old buildings are demolished and replaced every year. By modifying existing land use plans to encourage mixed growth instead of strictly suburban growth, many old buildings could be rehabilitated instead of demolished. This action would directly reduce demolition wastes and decrease construction waste, because rehabilitation uses fewer new raw materials per square foot of useful building space.

4.2 SOURCE SEPARATION AND RECYCLING

Source separation systems remove recyclable materials from the waste stream at the point of generation. Removing them not only reduces landfill requirements, but also can reduce collection and disposal costs, reduce pollution by using secondary materials as raw materials,

reduce the amounts of virgin materials processed, and consequently, reduce energy use. A variety of source separation systems may be used individually or in combination, and include:

- o Curbside collection
- o Drop-off centers
- o Buy-back centers
- o On-call collection
- o Commercial recycling
- o Composting yard waste

The method of collecting and processing recyclable materials may directly impact the participation rates and revenues received by a recycling program. The recycling alternative chosen must be compatible with the conditions found in each community. For example, a curbside recycling program that is successful in a densely-populated city may not be appropriate under the rural conditions found in the northern areas of the County. Section 8 sets forth the County's contemplated system configuration.

4.2.1 CURBSIDE COLLECTION

Curbside recycling is the term used for source separation programs in which recyclables are collected at the curbside. Residents volunteer, are offered incentives, or are required to separate recyclable materials at the source of their generation -- in the home. The separated materials are collected at the curb and then transported for further processing or sold directly to a market.

Collection and hauling is usually provided by compartmentalized vehicles operated by municipal or private haulers. The distribution of recycling containers for multi-material curbside collection has been reported to increase participation rates.

4.2.2 DROP-OFF CENTERS

Drop-off centers rely upon customers to bring collected recyclables to the center and to contribute the materials without payment. The centers range from unsupervised, small-scale drop-off centers such as "igloos" to supervised central processing facilities that are equipped to receive, process, and store the recycled materials for shipment to the markets. Drop-off center locations may include shopping centers, fire stations, schools, transfer stations and/or landfills. The small-scale, drop-off centers may be linked to a central processing facility.

Central processing facilities (CPFs) may include "picking" plants, where recyclables are removed from mixed refuse for further processing and/or shipment to the marketplace. CPFs are being integrated into some state recycling programs, however, CPFs may also be organized by the private sector in cooperation with local governments to provide a cost-effective recycling system. Goodwill Industries is an example of a successful partnership of this type. In a five-county area of Youngstown, Ohio, Goodwill has reported merchandise sales of more than $1 million.

It should be noted that staffed drop-off centers do not necessarily handle processing of recyclables. Both staffed and unstaffed drop-off centers have some advantages, such as low capital costs and easy collection of multi-materials.

4.2.3 BUY-BACK CENTERS

Buy-back centers pay for the recyclables received. They are similar to drop-off centers, but participation in recycling is increased by the financial incentive provided to the customer. Buy-back centers may be run by governments, secondary materials dealers, beverage container manufacturers, and other private or nonprofit operators. The State of Massachusetts is constructing a state-sponsored buy-back recycling facility with a design processing capacity of 160 tons per day in Springfield, Massachusetts to serve four communities. Other state-sponsored facilities are reportedly planned across the State of

Massachusetts, in New Jersey, and in New York. Buy-back centers may also serve as a processing center for a network of collection systems before shipment to market.

The two types of buy-back centers are nonpermanent and permanent. Nonpermanent buy-back centers may include mobile recycling trucks (MRTs), temporary containers for material drives, or company-provided containers. The MRT, which is compartmentalized and equipped with scales, is used to collect recycled materials on a regularly scheduled cash-back basis. The materials can be sold to a local recycler at the end of each day or taken to a central processing drop-off site and subsequently sold directly to a market.

MRTs are operated by both the private and public sectors. The MRT also may be used to recycle from commercial and industrial establishments. A particular advantage of the MRT is that it can provide a drop-off center in sparsely-populated areas. The temporary containers operate as buy-back collection centers, and revenue is collected by the vendor or may be shared by the vendor and a sponsoring organization as pay for the service.

Permanent buy-back recycling centers operate as intermediate collection or processing centers between the supply sources and the final markets. Operated by private or public sectors, recycling centers are supervised facilities.

Reverse-vending machines are another type of buy-back center. The machines accept aluminum beverage containers and weigh, crush, store, and pay the consumer for the cans in cash. The convenience of the operation and the cash incentive encourages aluminum can recycling. This recycling system is usually operated by private enterprise. However, Rhode Island recently provided partial funding for the purchase and installation of CANBANK reverse-vending machines in the state.

4.2.4 ON-CALL COLLECTION

On-call collection is usually achieved by placing storage containers at multi-family dwellings, commercial establishments, restaurants, industrial facilities, and other facilities. The materials recovered vary by program. The containers are collected by private or municipal haulers when called by the person responsible for the site. On-call collection is viable for commercial establishments that do not generate large volumes of waste on a regular basis. Examples include collection of corrugated paper at commercial/retail establishments and glass and aluminum containers from restaurants.

4.2.5 COMMERCIAL RECYCLING

High-volume recycling is often practiced by commercial establishments, restaurants, office buildings, government complexes and other high-volume generators. Depending on the volume generated, high-volume recycling operates as an on-call or regularly-scheduled collection program through which bins are collected by local private recyclers or through a community collection system. The materials collected primarily include high-grade office papers, corrugated paper, aluminum and glass. Businesses provide a source of potentially contaminant-free materials that require minimal processing before shipment to market and, therefore, command high market prices. Additionally, an incentive is available to these establishments in the form of avoided disposal fees and/or sales proceeds for the recycled materials.

Commercial recycling programs may be operated solely by the private sector. They require contracts between the collector and the business for materials collection and the distribution of storage containers to the client. It is possible for local government to augment commercial collection programs by instituting recycling activities at government offices.

4.2.6 COMPOSTING YARD WASTE

Yard waste composting is a process used to decompose vegetation (including lake weeks, grass clippings and leaves) to yield a material commonly used to fertilize soil. With composting programs, recyclables may be collected from the source, or residents may carry them to a drop-off center. The amount of yard waste (etc.) entering the solid waste stream is affected by seasonal variations and the nature of the community (urban or rural). Woody wastes can be chipped and mixed with other yard wastes or used alone for landscaping.

The most common composting process used for yard waste is the static pile system and/or windrow method. In these processes, organic material is kept outdoors in large piles that are agitated to promote even curing (see Section 4.6.4 for a detailed discussion of this technology). Many municipalities throughout the country have ongoing yard waste composting programs. Some of these programs produce compost that is used for fertilizing municipal lands, while others sell or give the compost to local residents and businesses.

4.3 TRANSFER STATIONS

The practice of transferring solid waste from automobiles, pick-up trucks, or small capacity collecting trucks to large capacity transfer trailers or containers and then hauling the waste to a disposal facility has been widely practiced throughout the United States. By consolidating the number of vehicle trips made from a community to a disposal facility, labor expenses are reduced and transportation costs are minimized, including fuel. Traffic, noise, and odors are the primary potential impacts that may be associated with transfer station systems.

Various methods can be used to transfer low and high volumes of solid waste. Two basic methods exist for transferring waste material for transport by truck: direct dump loading or hydraulic compaction prior to loading. Methods vary, but the underlying concepts are the

same--waste material transfer in an efficient and reliable method that corresponds to the type and volume of waste handled. Basic solid waste transfer systems are described below.

4.3.1 OPEN TOP SYSTEMS

Open top systems operate with collection trucks dumping directly into large open-top trailers. The trailer is normally located under a funnel-shaped hopper, to prevent spillage, and a backhoe is typically used to compact and distribute the load after it has been placed in the trailer. A variation of this system uses a dumping pit, in which a crawler tractor crushes and compacts the waste before pushing it through the hopper and into the trailer. The compaction pit system is used primarily in high volume transfer stations because of the speed at which trailers can be loaded and sent to the disposal site, and because of the relatively low cost of incorporating extra equipment.

All direct-dump systems use open-top trailers. These trailers usually are constructed of lightweight material because this type of loading does not exert great pressure on the sides of the trailer. Facility design can incorporate provisions that allow the transfer trailers to drive through as they load.

Once full, the open-top trailers are covered, and the refuse is hauled by over-the-road tractors to the final processing/disposal site. Various methods are used to unload the refuse from the trailers. Among these methods is the use of a "live-bottom" trailer. In these vehicles, the trailer floor acts as a conveyor which, when activated, unloads the refuse in approximately five minutes. Another trailer unloading system employs the use of hydraulic tippers at the disposal site to lift the entire trailer and tractor in the air to empty the refuse. Refuse may also be unloaded using a hydraulic push blade to empty the trailer.

Additional equipment can be installed at a direct-dump, open-top trailer system to distribute the trailer load more evenly and partially compact the refuse dumped into the trailer. In most cases, a stationary pedestal crane would be installed for this purpose.

4.3.2 COMPACTOR SYSTEMS

The second basic transfer system uses hydraulic pressure to horizontally compact the waste within the trailer. Two compaction methods have been used, and both employ enclosed reinforced steel trailers or trailer boxes specifically manufactured for solid waste transfer.

The first compaction method is partially a direct-dump operation in that waste is dumped directly into the trailer near the front. A hydraulic-powered bulkhead traverses the length of the trailer and compacts the waste against the rear doors. The entire compaction process is self-contained within the trailer beds; the bulkhead also pushes the load out the rear of the trailer at the disposal site. This method is used infrequently and is generally restricted to low-volume facilities.

A second compaction method, the one most frequently used, incorporates a stationary compactor into the system. This method compacts refuse in transfer trailers or a "roll-off" container, which closely resembles a transfer trailer though it is normally smaller in volume. However, "roll-off" containers are equipped with skid pads only or with very small steel wheels which are suitable for limited transportation distances. To be transported, the container must be lifted by special hoists onto a straight-frame, heavy-duty truck.

Each of the above methods of compaction and container systems can produce maximum legal payloads.

The compactors may be loaded at the transfer station by: direct dump into the compactor; direct dump to the tipping floor and the use of a front-end loader to push the waste into the compactor; or hydraulic push pits which fill the compactor. The advantage of the latter system is that it provides storage for waste flow delivery surges.

Any transfer facility can use these concepts to fit any size or level or service requirement. A facility can be designed to handle trucks, private passenger vehicles, or both.

Until recently, compactor-type transfer stations were predominant. However, with the development of open-top transfer trailers specifically geared for solid waste hauling and improved waste handling techniques, open-top facilities have become more common.

For facilities handling more than 600 to 800 tpd, open-top trailer transfer stations are advantageous because large volumes of waste can be processed quickly, and truck lines are reduced. For smaller capacity facilities, compactor-type stations may be desirable in terms of waste handling ease. The costs for both systems are similar, considering the transfer station and haul equipment requirements.

4.3.3 MINI-TRANSFER STATIONS

The mini-station concept is geared to rural areas with low refuse generation volume, or can be provided to residents in addition to curbside collection. The mini-station typically consists of a concrete pad with a small stationary compactor connected to a 20- to 50-cubic yard roll-off container. Usually, the hopper is protected from inclement weather by enclosure in a small pre-engineered metal shed. Enclosure also helps prevent loose refuse from blowing. This system has a relatively small capital expense and requires minimal time to implement.

Direct dump using containers is the simplest form of mini-transfer. It has been practiced for many years in rural or recreational areas and is typically employed where small volumes of waste are handled. The typical system consists of an earthen or asphalt ramp to an elevated area. Unloading vehicles dump directly into a drop box container located below, usually a roll-on/roll-off box. The sizes of these containers typically range from 10 to 40 cubic yards.

The simple loading method makes the direct dump container system highly reliable. Operations are interrupted only when the container is full. If roll-on/roll-off containers are used, container replacement is a simple, quick task.

4.4 LAND DISPOSAL

Land disposal is still a vital component in the solid waste management process. The need for landfills can be reduced through reuse, recycling, composting, waste-to-energy and/or energy recovery of waste materials. Processing wastes can reduce handling problems, increase the densities of wastes, and decrease the environmental problems associated with land disposal. Care must be exercised to ensure that an environmental problem does not develop during landfill operation or after closure.

The following sections describe typical landfill facilities and design considerations including leachate collection and treatment, and methane gas recovery.

4.4.1 SANITARY LANDFILLS

A sanitary landfill is an engineered facility that requires detailed planning and specifications, careful construction, and efficient operation. Three common configurations of sanitary landfill are the trench, area, and ramp methods.

The trench method is generally used on flat or gently sloping land where excavatable material exists below grade, and where groundwater is deep. Using this method, a trench is dug and the excavated material is stockpiled for use as cover material. The depth of the trench depends upon the stability of the soil and the earth-moving capabilities of the equipment available. The collection vehicles discharge their loads into the trench where the refuse is spread and compacted. Trenches are dug parallel to each other to provide the most efficient usage of the land, and are separated by a three to four foot dirt wall. The depth of trenches varies with soil and groundwater conditions, but is generally eight to ten feet.

The area method is well suited to ravines, quarries, and other natural or artificial depressions, although excavation may also be done specifically for the purpose of landfilling. The cover material is obtained either from this site or is imported. With this method of disposal, the refuse is placed on the ground surface or landfill liner by the collection vehicles, spread in layers, and compacted by the landfill equipment. Successive layers are built up to a depth of 10 to 12 feet.

The ramp method is a variation of the area method and is best suited to a steeply sloping terrain. The refuse is either dumped down the slope or at the base of the slope by the collection vehicles. Dumping at the base of the slope is usually preferred, because a better job of spreading and compacting can be achieved when the landfill equipment is moving up the slope.

The selection of the appropriate sanitary landfilling method should be based on the geologic conditions and on the economic factors associated with equipment, personnel, and cover material requirements. All methods of sanitary landfilling require competent facility design, proper operation, and effective and continual maintenance to reduce potential impacts to the air, land, and water quality. A buffer zone between the landfill and any existing residential and commercial areas is essential to reduce the effects of noise, odors, litter, and dust. A properly run

facility, operated in accordance with regulations set forth by MDNR, will not create a nuisance or present hazards to public health.

Leachate and methane gas from a sanitary landfill must be controlled to avoid polluting the air, land, surface and groundwater. Additionally, methane control must be implemented to avoid safety and nuisance problems resulting from its accumulation. The following sections discuss leachate and methane gas handling techniques in greater detail.

4.4.2 LANDFILL LINERS

The movement of leachate from landfilled waste depends on landfill design features. Thus, it is important to design a landfill with an effective liner to prevent the movement of leachate into the soil beneath the landfill.

The liner may accomplish this in one of two ways: it may physically prevent the movement of water and therefore contaminants, or it may absorb any chemicals carried in the water that does move through the liner. Liners may be constructed on-site, such as when soil materials are placed and compacted, or they may be manufactured flexible membranes.

For natural attenuation, the bottom of the landfill can be lined with compacted clay or silt, bentonite, membrane liners or other rather impermeable materials. Act 641 requires that Type II landfills with a natural clay base have minimum thickness of ten feet and a maximum demonstrated permeability of 10^{-7} centimeters/second. Landfills with compacted soil liners using imported materials must have a minimum thickness of 3 feet, compacted to a maximum permeability of 10^{-7} centimeters/second.

When soil conditions are such that naturally occurring or imported soils are unavailable or inappropriate, geosynthetic liners can be employed to control leachate movement. A wide variety of geosynthetics are available for use in containing leachate. These liners are installed by

unrolling sheets of plastic and then using specialized equipment to form bonded seams between the individual sheets. Considerations when using geosynthetic liners under landfills include providing a firm base under the liner, construction quality assurance, and protection of the liner after construction. The liner is usually extended up the side of the landfill to the ground surface where it is anchored.

Act 641 permits the use of polyvinyl chloride sheeting or equivalent material not less than 20 mils thick and underlain with a minimum of two feet of soil compacted to a maximum permeability of 10^{-6} centimeters/second, or 30 mils thick installed on native soil.

To provide additional protection to the environment, landfills using multi-liner systems are being designed. These liner systems use a combination of compacted soils and geosynthetic membranes with leachate collection and gas control measures.

4.4.3 LEACHATE TREATMENT

One of the most important considerations in the design, operation and long-term care of landfills is managing leachate formed when water passes through the deposited waste. Leachate is collected at a landfill by gravity outlets, drains, and ditches. The leachate accumulates at the bottom and sides of impervious liners (synthetic and/or compacted clay material) built into the landfill. The collected leachate is then treated by recycling, on-site treatment, discharge to a municipal treatment plant, or a combination of these approaches.

Leachate is recycled by collecting it at the base of the landfill and redistributing it over the top of the waste. Recycling can greatly reduce leachate chemical concentrations, even out the flow of leachate that must be removed from the landfill for further treatment, and possibly enhance the stabilization of the landfill.

On-site treatment uses pond systems, conventional treatment plants, anaerobic treatment processes, and physical-chemical units. Treatment

of leachate is very similar to the treatment of wastewater and is site specific. Chemical treatment may be with the use of lime, oxidants, coagulants or other organic material. Leachate treatment may also include adding the sludge to composting beds to help balance nutrients, moisture, and nitrogen and to accelerate the process of composting, thus aiding in a better end product.

Biological treatment of leachate using aeration lagoons (made of wood or fiberglass) is an effective alternative. The lagoons remove approximately 90 percent of the biological oxygen demand (BOD), transfer volatile substances from the water into the air, and help oxidize organic matter. The use of aeration lagoons is most effective when the maximum surface area of the lagoon is exposed to air for the longest possible period.

The most commonly employed leachate treatment option is discharge to municipal treatment plants. Because leachate strengths are greater than normal wastewater, care must be taken to avoid overloading the plant.

4.4.4 LANDFILL GAS CONTROL

The primary purpose of gas control is to prevent the gas from damaging plants and property or causing injury to people. Methane generated in landfills kills vegetation (it displaces oxygen from the root zone). More importantly, gas can migrate to nearby buildings and accumulate. If methane concentrations exceed the lower explosive limit of 5 percent, there is danger of a methane gas explosion. At some landfills, the methane is just vented to the atmosphere (or it is flared). At others, it is cost effective to install gas recovery wells and recover the gas for its energy value.

Established landfills with a sizable quantity of waste in place at an adequate depth are the best candidates for methane gas recovery.

Landfill methane gas recovery is an established technology. One landfill has employed this technology successfully since 1975. The

equipment typically used for methane recovery consists of pumping, compression, absorption and analytical equipment used in conventional natural gas extraction.

Gas pumped from a landfill can be used directly at the site or sold to a gas user. If the gas is used on the fill site, it can be burned to produce steam or used to generate electricity with turbines. If it is sold, it may be practical to pipe the gas directly to a boiler at the user facility. The landfill gas must first pass through filters to remove carbon dioxide, moisture, and hydrogen sulfide. The gas then can be injected into the furnace in combination with the regular boiler fuel (coal, oil, or natural gas).

Availability of a boiler near a landfill is not common; however, natural gas pipelines are located near some sites. The gas may then be upgraded to pipeline quality and fed into residential gas lines. This has been planned for only a few of the methane recovery facilities because a substantially higher capital cost is involved and the cost effectiveness is less than that for utilization as an industrial grade gas. The advantage to this method is that there is greater market potential for pipeline gas than industrial gas. With either of these two methane recovery systems, it may be necessary to flare the low quality gas along the periphery of the landfill to prevent gas migration.

Methane recovery may be done by the landfill owner or contracted to a private company that specializes in methane recovery. A private gas reclamation company will run tests, investigate markets, invest the needed capital, construct and run the facility for the landfill owner, and pay the owner a royalty. Generally, these companies require a lease for at least the duration of the testing, which will continue for a specified number of years if the site is considered potentially profitable, or will expire as soon as the site is deemed an unlikely candidate. If the owner runs the operation, revenues are maximized, but at a financial risk.

4.4.5 DISPOSAL AREA POTENTIAL USAGE

Efficient use of landfilled land after the completion of filling requires long-range planning. The best strategy is to plan for the eventual site use before the landfill is constructed and operated.

Potential uses for closed sanitary landfills are:

- Nature park
- Recreational park
- Tennis courts
- Golf course
- Ski or toboggan hill
- Parking lot
- Commercial or industrial building

Planning is particularly important prior to landfill development when construction of a building on or near the landfill site is contemplated. The locations of structures requiring special support, recreational facilities requiring specific topography, and gas control systems to protect future buildings are features that could be considered when designing a landfill. Depending on the planned site use, certain landfill factors can be modified to facilitate future use, including:

- Cover thickness
- Slope
- Cover/waste ratio
- Degree of compaction
- Use of additives and cements
- Selective disposal
- Maintaining undisturbed structural pads

When planning final site use, the critical criteria that must be considered are settlement, foundation characteristics, control of leachate and gas, vegetation, and final grade.

4.4.6 CONSTRUCTION/DEMOLITION/DEBRIS LANDFILLS

Solid waste landfill disposal areas limited to the disposal of construction and demolition debris may be exempt from many of the permitting requirements of a sanitary landfill. Construction/demolition debris is typically composed of inert materials such as concrete, brick, uncontaminated soil, and rock. The disposal of inert materials on land does not require a construction permit or operating license (although size and location of sites intended to receive more than 1,000 cubic yards must be recorded by the County Health Department or MDNR).

By establishing facilities to accept these materials, the volume of inert materials disposed at sanitary landfills can be reduced, conserving this landfill space for municipal solid waste and extending the life of sanitary landfills. However, if construction/demolition debris is contaminated by other types of solid waste, disposal at a sanitary landfill is required.

4.5 WASTE-TO-ENERGY TECHNOLOGIES

Energy recovery from the combustion of solid waste in specially designed furnaces equipped with boilers has been used since the beginning of the century both in the United States and, to a greater extent, in Europe. Hence, they are known as "resource" recovery or waste-to-energy facilities.

Recently, waste-to-energy systems have been considered as a major alternative to full reliance on sanitary landfilling. More than 100 waste-to-energy facilities are either operational or under construction in the United States.

The following recovery technologies are discussed:

- o Mass Burn Systems
  - Field Erected Units
  - Modular Combustion Units
  - Water Cooled Rotary Combustors

- o Refuse Derived Fuel (RDF) Systems
  - RDF Combustion
  - Wet RDF System
  - Spreader-Stoker Firing
  - Suspension Firing
  - Co-Firing with Coal or other Fossil Fuel

- o Other
  - Pyrolysis
  - Multiple Hearth Furnace
  - Fluidized Bed Combustion
  - Suspension Fired Waterwall
  - Anaerobic Digestion

4.5.1 MASS BURN SYSTEMS

Mass burn incineration, though accomplished at a high capital cost, is a proven technology that has been applied extensively in Europe and Japan. The energy produced can be in the form of hot water, steam, electricity, or any combination of these forms of energy.

For a successful program, the following must be accomplished:

- o A guaranteed waste load that assures capacity utilization of a facility must be contracted for the life of the system.

- o The energy customer(s) must be under contract for the life of the system.

- o A decision by the governmental unit to have minimum landfilling.

Whenever an energy producing facility is considered, source separation of materials previous to energy recovery is suggested. The following sections describe mass burn technology alternatives.

Field Erected Units

The combustion of unprocessed solid waste, combined with heat recovery, is currently the most widely practiced energy recovery technique in the world. In a plant designed for mass burning, unprepared refuse (as received from the collection vehicles with little or no sorting) is charged directly into a combustion furnace. The heat generated from the combustion process is recovered (as steam) by waterwall radiation boilers. The steam may be sold directly to a customer or converted to electricity using a turbine generator and then sold, usually to a large utility. Gaseous products of combustion pass through air pollution control equipment. Ferrous metals and other materials can be recovered from the bottom ash for eventual sale, and the remaining bottom ash and flyash from the air pollution control system are delivered to a landfill equipped to accept such material.

This technology has encountered a few mechanical problems. Problems experienced include grate failure and superheater corrosion. Grate problems have been largely overcome through improved design and operating practices. Superheater corrosion can be minimized by limiting the upper steam temperature and pressure. Advances in metallurgy have also helped to correct this problem. It is important to note that at mass burn facilities where such problems have occurred, the problems have been corrected and the facilities have continued in operation.

With more than 300 facilities in operation worldwide, conventional mass fired waterwall technology is the most thoroughly demonstrated system in the energy recovery field. In the United States it has the longest history of successful continuous operation. Conventional mass fired systems have been successful in applications ranging up to 3,000 tons per day (tpd). Many qualified contractors are involved in marketing and developing these systems, and new contractors are constantly entering

this competitive market. In addition, due to the number of responsible contractors offering mass fired systems, capital cost competition and alternative financing methods produce economically favorable systems.

In summary, the merits of conventional mass fired waterwall technology are its simplicity and proven reliability. It is an environmentally acceptable system and can produce energy as steam or electricity. Its competitive capital cost and revenue from energy sales make it a cost-effective energy recovery system. In addition, many experienced and qualified vendors offer systems that use conventional mass fired waterwall technology, and many of them are willing to own the facilities they build.

Modular Combustion Units

Modular combustion units (MCUs) are a prefabricated variation of the mass burn technology. These "off-the-shelf" furnace/boilers are available in a wide range of small-scale sizes that fire as-received solid waste. Individual units range from 10 tpd to 200 tpd in size. MCUs vary from conventional mass fired waterwall systems in a number of ways:

- MCUs are a standardized design and are largely shop-assembled to minimize the subsequent costly field erection work.

- MCUs sometimes use refractory furnaces and waste heat boilers as opposed to waterwall furnaces.

- Some MCUs operate under starved air conditions as opposed to excess air conditions. Starved air conditions produce pyrolytic decomposition of refuse in a primary chamber and combustion of products of the pyrolysis process (gases) in a secondary chamber, sometimes with the assistance of auxiliary fuel burners.

- o MCUs generally produce steam at temperatures and pressures lower than conventional mass burn units. Only a few MCU facilities generate electricity.

- o MCUs sometimes use rams and hearths as opposed to other movable grate systems.

- o MCUs may require additional presorting of the refuse to remove large bulky items because of their small unit size.

The relatively small size of MCUs limits their application to the lower end of the capacity scale range (approximately 500 tpd or less). MCUs have proven to be a successful and reliable technology, and dozens of facilities are operating throughout the United States. However, these units require extensive overhauls (replacement) of the refractory linings on a fairly frequent basis (4 to 7 years). This represents an expense that must be considered during cost comparisons and analyses with other technologies.

Experienced vendors offer modular combustion technologies. One vendor has assisted in approximately 20 MCU installations that are currently in operation. A pre-engineered, insulated steel frame metal building can house incineration equipment and provide a solid waste storage area. This typically results in lower initial capital costs when compared to conventional mass fired systems. The major disadvantages of MCUs, as compared to conventional mass fired systems, is a lower energy recovery efficiency and the need for frequent refractory overhauls.

MCUs are a demonstrated commercial technology with established reliability. The technology is environmentally acceptable and can produce energy as steam or electricity. It is offered by many qualified contractors, some of which are willing to own the facility.

Water-Cooled Rotary Combustor

Rotary combustors are mass fired systems consisting of a rotating waterwall combustion cylinder coupled to a conventional vertical tube waterwall furnace. Individual process lines can handle up to 500 tpd. The heat of combustion is recovered as steam. During combustion, the cylinder rotates at a controlled rate to ensure thorough mixing and combustion of the wastes. Most material is consumed in the rotary combustor. Remaining unburned material is consumed on an afterburning grate. Rotary combustors usually operate at 40 to 50 percent excess air.

Currently operating rotary combustor plants range from 60 to 300 tpd installed capacity. Costs are competitive with conventional mass fired technology. There are two plants operating in the United States (200 tpd and 500 tpd) with a third facility presently under construction and a number successful of foreign operations. Westinghouse/O'Connor is marketing this water-cooled rotary combustor technology.

Rotary combustors are environmentally acceptable; they produce energy as steam or electricity; and they are priced competitively with other mass fired technologies. Rotary combustors are operating at various locations world-wide, and two plants have been developed in the U.S.

4.5.2 REFUSE DERIVED FUEL (RDF) SYSTEMS

The characteristic that distinguishes RDF systems from mass burn systems is the "processing" of solid waste before its combustion and conversion into energy. All RDF energy recovery systems require some solid waste processing before combustion. The degree of preparation necessary is determined by the type of combustion technology used and the extent to which materials recovery is practiced.

Compared to mass burn systems, RDF uses less combustion air, which reduces the size of fans and air pollution control equipment needed and produces more uniform heat release. Additionally, RDF systems provide

the opportunity to transport the fuel to another location for use in a boiler.

The remainder of this section presents an overview of front-end processing mechanisms for RDF systems, followed by a description of the RDF combustion systems most commonly considered for energy recovery. Section 4.5.3 describes other energy recovery technologies that also require some degree of front-end processing.

Front-End Processing Systems

Front-end processing increases the capability to recover material components from the waste stream, and produces a more homogeneous fuel for better control of the combustion process.

In a typical RDF facility, solid waste received is deposited at the facility and stored on a tipping floor. It is then transferred via front-end loader onto a feed conveyor system and transported to a size reduction system. The size reduction system may include various types of shredders or hammermills and screening operations.

Depending upon the type of combustion system employed, the RDF may then be processed for materials recovery or further processed to produce a higher quality fuel. Further processing may include additional screening, shredding, air separation, and densification. RDF fuel forms include coarse, fine, fluff, powdered, or densified. Materials recovery may include ferrous metals, aluminum, glass, plastics, and other materials. Mechanical processes to accomplish separation of these materials include:

Magnetic Separation. The magnetic properties of iron and steel make ferrous recovery one of the easiest material separation processes. Magnets are usually suspended over the end of a conveyor carrying shredded solid wastes. As the wastes pass by the magnet, ferrous metals are picked up and diverted into a separate stream. Magnetic separation may be accomplished at many different

points in an energy recovery facility. Most often, it is performed following primary shredding. The specific point at which magnetic separation takes place and the type of magnet used depend upon the particular market specifications, the market locations for the ferrous scrap, and requirements for other separation processes.

Rotating Screens or Trommels. A trommel is a cylindrical screen that rotates around the axis of the cylinder. This process separates the wastes through particle size differentiation. Trommels can be used following a primary shredding process as classifiers to separate the light or combustible RDF and the heavy, non-combustible fraction; or following classification and secondary shredding to remove dust, grit, and glass particles to produce a better fuel product. Trommels are also used as processing steps in the recovery of materials in the heavy fraction (metals and glass).

Vibrating Screens. Vibrating screens consist of one or more screens oriented at the same angle and stacked vertically with different mesh openings. Although similar to trommels, vibrating screens give better separation in the smaller particle size ranges and are less expensive. However, vibration screens have lower throughput capacities than trommels and have problems handling wastes with large particle sizes (which can plug the screen). Vibrating screens are used primarily to process or separate large pieces from the heavy fraction (particularly grit, dirt, and crushed glass from other materials).

Electroseparation. These processes generally employ electromagnetic properties and use nonferrous metal conductivity to separate these metals from refuse. Nonferrous metals are moved through an electromagnetic field that deflects these materials out of the refuse stream. This system has been successfully used on aluminum and is being investigated for other nonferrous metals. The units are usually preceded by classification, secondary

shredding, and trommels or vibrating screens to produce the required feed material.

Optical Sorting. This sorting method operates on only a narrow range of particle sizes in the glass fraction of the waste. It uses the reflective properties of different colors of glass (flint (clear), amber, and green) to sort the glass particles by color, increasing the market value of the material. The primary disadvantages of this system are relatively low capacity of available equipment, high capital cost, and mixed performance record of the system.

Heavy Media Separation. This method takes advantage of differing mass densities of materials. For example, when two materials in an unsorted mixture are introduced into a liquid media whose density lies between the densities of the two materials, one material will rise in the liquid while the other will sink. Separation can be assisted by the introduction of small air bubbles into the liquid media to help float the lighter material (known as froth flotation). Heavy media separators have been used for the separation of glass in the heavy fraction, and are also being investigated for the separation of nonferrous metals. This equipment requires an enriched material that has undergone a great deal of preprocessing.

Most RDF systems have experienced problems with the front-end processing steps, including solid waste shredding operations, materials separation, and RDF storage. Some of the major problems such as explosions, high rate of wear of shredder components, and long-term RDF storage have not been completely resolved. These represent problems in the full-scale operational reliability of these systems.

The high cost of shredder installation and maintenance has now been accepted as a normal operational expense. The difficulties associated with long-term RDF storage are being overcome by carefully scheduled

processing operations, and using these facilities as interim "surge" bins rather than for long-term storage.

RDF systems incorporate many interdependent mechanical processes that are susceptible to breakage. The redundancy required to achieve a high degree of on-line reliability dramatically increases capital costs.

RDF Combustion Systems

The RDF combustion systems most frequently used are described below.

Wet RDF System. After initial preprocessing, Wet RDF processing systems hydropulp solid waste as a first step in the production of an RDF. This process is almost identical to the hydropulp operations used in the pulp and paper industry. Liquid cyclones accept slurry from the hydropulper and separate combustibles from noncombustibles. The combustible fraction of the RDF stream is dewatered, and the remaining fiber is burned in a spreader-stoker furnace. Facilities using this combustion system have had a number of operational problems. One facility has been closed for some time and is now being converted to a mass burn system. The Wet RDF system is capital cost intensive, dependent on recycled materials markets, and limited in commercial experience.

Spreader-Stoker Firing. RDF may be fired in a number of different furnace designs to complete the energy recovery concept. Most common is the use of a spreader-stoker furnace boiler. This design concept has been derived from granulated coal firing systems. RDF is introduced to the furnace by pneumatic assisted mechanical spreaders. The RDF ignites and burns in partial suspension. Unburned particles drop onto a traveling stoker where firing is completed before the ash is discharged. The RDF used in these systems vary from highly prepared fuels to coarse fuels. The more recent systems constructed and proposed have been the latter.

Spreader-stoker boilers have been in successful operation for decades firing coal and other low-grade fuels. However, all of the operating RDF fired spreader-stoker installations investigated have experienced various design and operational problems. Each installation has gone through an extensive retrofit and modification process.

Spreader-stoker firing provides an environmentally acceptable system, it produces energy as steam or electricity, and it has been applied to a wide range of project sizes. However, based on its history of operation, it cannot be fully regarded as a commercially demonstrated and, reliable technology. No operating RDF facility can yet claim continuously reliable disposal of solid waste. Projects currently operating successfully with this technology have undergone extensive modifications. Several qualified full service contractors offer this technology; however, the competition is not as strong as with the mass fired systems. Only one installation is developer-owned.

Generally, total RDF spreader-stoker system life-cycle costs are comparable to those of mass burn facilities. RDF spreader-stoker combustion units, including front-end fuel preparation equipment and storage facilities, may have lower capital costs than mass fired units of equivalent heat input. However, total RDF system operating costs are higher due to the front-end processing and storage facility operating costs. Because of the limited RDF experience and the problems encountered with RDF facilities, it often is difficult to compare the costs of the two. RDF facilities have not established a long-term track record against which to monitor actual costs.

Co-Firing with Coal. RDF may also be co-fired with coal in existing large utility-class suspension fired boilers. Examples include installations at Ames, Iowa; Madison, Wisconsin; and Lakeland, Florida. The principal advantage of an RDF co-firing system is in capital cost savings: existing boilers are used.

However, a suitable fuel user must be identified, and agreement on RDF purchase and sale reached. In identifying a fuel user, the current operation must include a pulverized coal fired boiler within an economical transportation distance of the RDF processing plant.

The RDF used in these systems has generally been a highly prepared fuel. To better control the combustion operation in the utility boiler, the noncombustibles must be removed. The fuel also must be prepared fine enough for suspension burning. Facilities designed for this purpose have had difficulty in continuously meeting the specifications required for co-firing. Often, substantial boiler modification has been required.

Technical problems have also been encountered in RDF co-firing. Because different optimum process temperatures are specific to each fuel, co-firing results in a substantial reduction in boiler efficiency or in uncontrollable slagging. Slagging is caused by the low fusion point of ash in the RDF when it is burned at temperatures common to coal-fired systems. Large power utilities are generally reluctant to consider co-firing because of these problems and their impact on overall system reliability.

4.5.3 OTHER ENERGY RECOVERY TECHNOLOGIES

Other energy recovery technologies are available but are considered experimental or developmental. In some cases, the technology is unproven or based on unsuccessful operating experience. Questionable economic viability and lack of market availability for the fuel produced are other reasons to question the suitability of such technologies. The majority of energy recovery technologies described in this section require a front-end processing system for fuel preparation and, therefore, encounter the same problems that are evident in the RDF systems.

Pyrolysis

Pyrolysis is the chemical decomposition of solid waste brought about by high temperatures in an oxygen deficient environment. Solid waste pyrolysis projects have been developed to produce solid fuels, oils, and various fuel gases.

Several large commercial pyrolysis energy recovery facilities have been built. The Monsanto Langard process was used in a 1,000 tpd facility in Baltimore, Maryland. After years of testing and modifications, the facility was closed. Processes have also been developed by Occidental Petroleum, Union Carbide, and Andco Torrax, who constructed a 100 tpd facility for Disney World in Florida. All of these pyrolysis facilities have been closed. No full-scale commercial pyrolysis facility has yet been substantially tested in day-to-day operations using municipal waste.

Multiple Hearth Furnace

Multiple hearth furnaces are commonly used for sewage sludge incineration. The concept of using a multiple hearth furnace for solid waste disposal is based on a brief test operation in California. This test indicated that RDF could be substituted for fossil fuel in the disposal of sewage treatment plant sludge. RDF was shredded, passed through air classification, and was mixed with sludge. Although several test operations have been implemented, no other operating history is available.

Fluidized Bed Combustion

Fluidized bed combustion requires the preparation of RDF for injection into a fluid bed combustor. The combustor is constructed of carbon steel with refractory brick and ceramic fiber insulation. A bed of sand is used as a fluidized bed to induce the flowing motion of the gases. High temperature gases are transported to a waste heat boiler for steam generation. This technology is becoming widely used in the utility

industry and in wastewater treatment plants for sludge, as well as in the chemical industry. However, the technology is in a developmental stage and, as yet, is considered unproven for use with solid wastes.

Suspension-Fired Waterwall

Suspension-fired waterwall technology requires preparation of a highly refined RDF that is burned exclusively as a fuel in full suspension-fired units. A suspension-fired boiler operates at a higher thermal efficiency than mass fired or spreader-stoker boilers; however, this technology is not economically competitive with normal RDF firing systems because of costs associated with waste processing, storage and firing systems. It should be noted that the fuel preparation system required for this technology has been plagued by several serious explosions. The only operating full-scale facility at Bridgeport, Connecticut was shut down and subsequently reconstructed as a mass fired facility.

Anaerobic Digestion

Anaerobic digestion, a bacterial decomposition process that takes place in the absence of oxygen, occurs in existing landfills. The Pompano Beach, Florida, demonstration project attempted to show that similar conditions could be created under controlled conditions. The light fraction of the solid waste was mixed with sewage sludge to generate methane gas. The demonstration facility, which has operated intermittently, is now operating at a reduced throughput from design capacity. The technology remains in an experimental stage and is considered unproven.

4.5.4 COINCINERATION

Coincineration, sometimes termed codisposal, is defined as the combustion of wastewater treatment sludge with municipal solid waste. Coincineration offers potential savings in investment, operating expense, and energy consumption when compared to other available

county-wide sludge disposal alternatives. Currently, sludge from the majority of Oakland County wastewater treatment plants is hauled to an extension of the Detroit sewer system for disposal.

To successfully coincinerate wastewater treatment sludge, the sludge must be dewatered to a moisture content of 20 percent or lower. Incorporating sludge into refuse burned in an energy recovery incinerator requires installation of a larger and more costly boiler. The capacity increase required for burning sludge is proportional to the heat content of the sludge, rather than its mass. For example, burning 20 tpd of sludge may require an incremental boiler capacity equivalent to 25 to 35 tpd of refuse. This is because approximately 20 percent (by weight) of the sludge fed to the boiler is water, which when evaporated creates water vapor. The extra water vapor increases the volume of flue gas to be handled by the boiler and downstream flue gas handling and disposal facilities. These portions of the facility must also be increased in size and capacity accordingly.

The feasibility of implementing coincineration within the County depends on the following considerations:

- Future availability of the Detroit sewer system for sludge disposal.
- Costs of dewatering sludge.
- Cost of transporting sludge to the coincineration facility.
- The equipment capacity increase required at the energy recovery facility to accommodate sludge coincineration.

4.6 NON-ENERGY RECOVERY TECHNOLOGIES

In the previous section, technologies were discussed that provide for disposal of solid wastes while recovering energy. Another group of technologies exists that dispose of wastes without recovering energy. Land disposal can be included in this group of technologies and is discussed in Section 4.4. Other available non-energy recovering technologies are discussed in the following sections. Some of these

technologies are comprehensive; others are intended to be parts of larger solid waste management systems. The technologies include:

- o Incineration without waste heat recovery
- o Baling
- o Shredding
- o High density compaction
- o Composting
- o Chipping

4.6.1 INCINERATION WITHOUT ENERGY RECOVERY

Since the turn of the century, incineration has been the most commonly used method of solid waste volume reduction. Most urban areas used incineration to extend landfill life. After passage of the Clear Air Act, many incinerators were closed, because few were equipped with air pollution control equipment and the expense of retrofitting was more than most municipalities could afford. The Arab oil embargo and subsequent energy crisis of the mid- and late-1970s also affected incineration practices.

Today, very few solid waste incinerators are in operation; instead, energy recovery plants are being built to combust solid waste and recover heat energy to produce steam and/or electricity. The production of steam and/or electricity helps to offset the capital and operating costs associated with implementing such technology-intensive facilities.

Construction of new incineration facilities without heat recovery generally is not considered a feasible option for solid waste management, when considering the costs of implementation. Although each incineration project must be evaluated on a case-by-case basis to determine whether or not energy recovery is cost effective, if the revenue generated by the sale of power offsets the cost of the turbine generator, energy recovery generally is worth the capital expense. An energy recovery facility could be used if a form of combustion is required to reduce the volume of material landfilled, and this facility

would be capable of generating revenue. The various types of energy recovery facilities are discussed in detail in Section 4.5.

4.6.2 BALING

In a baling operation, municipal solid waste is compacted into a "bundle." The baled waste is then transported to a balefill (landfill) where it is stacked using specially equipped tractors or fork-lifts. The advantages of a baling and balefill operation (versus a conventional landfill) include:

- The ability to routinely achieve higher in-place densities of solid waste material, thus increasing site disposal capacity and useful site life by 25 to 35 percent.

- Delayed and reduced decomposition. The production of leachate and/or gas usually takes place at a lower rate than at a conventional landfill.

- Reduction in the likelihood of nuisance conditions such as blowing paper and litter, flies, odors, and vectors; and a more aesthetically pleasing balefill (landfill) operation.

- Increased handling and transportation efficiency through production of a compact bundle of uniform size and shape.

A baling facility typically consists of a totally enclosed building complete with a tipping floor and a bale storage area. The equipment at a baling facility includes a steel-belted apron conveyor or other mechanical system to feed the baler, a baler complete with feed hopper, a bale tier, and a bale conveyance system. These facilities may be located near the balefill (landfill) or remote from the balefill (the baling facilities can also act as transfer stations).

The two types of balers typically used for raw waste are classified as high-density or low-density batch-feed balers. Both types of balers are capable of compressing the waste under hydraulic pressure.

A low-density baler produces a bale that is wire-tied as it is ejected from the machine. Typical densities for these bales range from 1,100 to 1,300 pounds per cubic yards. Unlike the high-density baler, the low-density baler uses a single compaction ram to compress the waste. These balers have processing capacities of 10 to 40 tons of waste per hour per unit and are well suited for smaller communities with lower waste processing requirements. Wire ties or bale strapping are usually necessary to hold the bale intact.

In a high-density baler, waste is compressed into a bale by using two or three compression rams. The density of the resultant bale is high. Typically, bales from high-density balers range from about 1,600 to 2,000 pounds per cubic yard. Because of the density, some manufacturers do not feel tie wire is necessary to keep the compacted material together. However, experience has shown that untied bales remain intact only for very short haul distances, and thus installations without wire ties are effectively limited to use at (balefill) landfill sites where bale haul is very short. High-density balers can bale up to 50 tons per hour per unit of raw waste and are typically used in larger operations.

Both types of balers are restricted in their ability to process some bulky items and other large, oversize, or unusual wastes. Such wastes require sorting and removal for the waste stream. The low-density balers have greater restrictions.

The construction cost associated with a balefill is approximately the same as for a conventional sanitary landfill of the same size. However, the capital cost (per ton) of refuse placed in the balefill may be less than for a landfill because a given area holds more if high-density bales are placed instead of raw refuse. Some decrease in balefill site operating costs may result due to the different type of equipment used.

While baling/balefill installations provide a number of advantages which have been previously discussed, there also are a number of disadvantages which include:

- o High overall capital and operation and maintenance costs due to the front-end processing of the waste.
- o Great potential for unscheduled downtime of front-end processing equipment.
- o Lower decompostion gas production rates from the landfill.
- o Increased materials handling requirements.

4.6.3 SHREDDING

Shredded solid waste is defined as refuse that has been mechanically ground, shredded, or pulverized to a smaller mean size. Size reduction is achieved by different types of crushing action. The term shredder applies to many types and sizes of equipment such as grinders, crushers, hammermills, and shearing-type shredders.

The two most common types of shredding equipment used for municipal solid waste include the hammermill-type shredder and the shearing-type shredder. Hammermills use impact, attrition, and shearing action for size reduction. Shearing type shredders use two rotors that operate by intermeshing their respective hook/shear blades and shaft spacers. The two rotors turn at different speeds and in opposite directions. The hooks grab and position the material for the shearing action of the blades.

Equipment selection criteria for a shredded solid waste system include objective factors such as machine weight and size, rotor weight, rate in tons per hour; and subjective factors such as actual capacity, unit power, and maximum output particle size.

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Shredding operations may serve as an independent waste reduction system or may serve as a unit in combination with other waste handling facilities. Other solid waste systems that may be enhanced by the shredding of the waste stream include composting, baling, energy-recovery technologies such as RDF systems, and material recovery systems.

A typical shredding plant consists of access roads, truck scales, a tipping floor for solid waste, conveyors to transport waste to the shredders, and shredders. All storage is enclosed, but the shredders are in separate areas outside or are in a building equipped with explosion panels or doors. Following the shredders is materials recovery equipment (such as a ferrous recovery magnets, conveyors, and hoppers) and appropriate loading and hauling systems to deliver shredded material to the landfill or other processing facilities.

Shredded municipal solid waste provides a less attractive environment for vermin, destroys many fly eggs and larvae found in incoming waste, and reduces odors and the likelihood of rodents. A shredfill produces approximately 15 percent higher density fill, which increases the landfill site life.

Operationally, shredded solid wastes are easier to handle in solid waste management systems. Differential settlement and deterioration of compacted, shredded solid waste proceeds more quickly than in typical unprocessed material landfill operations thereby enhancing operations. Wind displacement of shredded solid waste can be a problem, but can be controlled by features such as fencing and/or onsite stockpiles of emergency cover material (as well as the equipment and manpower required for cover placement).

The shredding equipment tears open plastic trash bags, breaks glass bottles and jars, cuts paper, plastics, and rags, and crushes metals. The crushing of pressurized can and other materials in shredders causes explosions and fires with some frequency. These explosions and equipment "wear-and-tear" require that the units be shut down

periodically for maintenance and replacement of worn or damaged parts. Design must provide for backup machines with sufficient capacity to complete the day's loading to provide a maintenance period for the damaged equipment.

Tire Shredders

Landfilling large numbers of tires creates breeding grounds for vectors (such as insects) and vermin (such as rodents), reduces land reuse options, and degrades the appearance of the surrounding environment. Tires do not compact well and tend to migrate to the surface of the landfill.

Shredded and sliced tires compact better, and landfilling this material improves the overall site aesthetics as well as reduces the threat to public health. However, cost estimates of $.05 to $2.00 per tire for shredding processes have discouraged the practice in the past. In reality, off-set costs associated with landfill capacity or site life increases the viability of this process.

Equipment components are similar to the equipment previously described for shredding municipal solid waste. Output particle size determines the performance specifications for tire shredding. Shearing-type shredders are primarily used for tires. Generally, less energy is required to operate tire-shredding equipment than solid waste shredding equipment. Limitations imposed by the machinery include the intake diameters of tires and the throughput capacity. Maintenance costs are primarily a function of blade replacement cost.

4.6.4 COMPOSTING SYSTEMS

The primary types of composting systems used for materials found in a municipal solid waste stream include static pile and in-vessel. These are described below.

Static Pile

The static-pile compost system is an adaptation of a European process in which organic material is piled outdoors for several weeks in long windrows that are agitated either manually or mechanically. Windrows typically consist of piles of compost materials, usually six feet high by 12 to 14 feet wide. The length of the windrows are a function of the quantity of compost materials received. Aisle space is usually provided between pairs of windrows to facilitate turning or agitation. Subsequently, the material is "cured" for an additional two to three weeks during which the more resistant cellulosic materials are digested.

The advantages of the static-pile systems are:

- The system is mechanically simple, and should result in a mechanically-reliable operation.
- A shallow compost pile is used so there should be little concern over compaction causing uneven air distribution.
- The material is placed in position by an operator and remains in place until the operator removes it. Therefore, there can be no short circuiting. The operator has the advantage of being able to visually inspect the material as it is placed, composted and removed.
- The aerated static-pile process is a workable composting process.

The concerns identified are as follows:

- A large land area is required.
- The system has a low degree of mechanization and is therefore labor intensive.

In-Vessel

In-vessel composting involves the use of a confined structure to biologically stabilize wastes under aerobic conditions. The structure itself can be circular or rectangular towers, horizontal tunnels, or bin or box-type vessels. Basic steps for in-vessel composting are considered to be similar to those in windrow and static-pile systems--mixing of sludge and refuse with a bulking agent, aeration to promote decomposition and kill pathogens, and curing to achieve additional stabilization.

The in-vessel composting process is considered to be a "high rate" process employing mechanically-assisted digestion, with retention of compostable material in a bin or tank for a period of about five days. During this time, the material is stirred, and air is injected into the waste to maintain temperatures between 150^{o} to 180^{o} F.

Similar separation processes as discussed in Section 4.5.2 would be used in preprocessing the solid waste for in-vessel composting. Therefore, this technology would be compatible with the materials recovery of recyclable materials.

In-vessel composting of municipal solid waste is always co-composted with municipal solid waste sludge in RDF systems. There are no in-vessel composting systems operating with only municipal solid waste.

Co-Composting

Co-composting is the concept of composting refuse and sludge together. Preprocessing of incoming refuse is required to render the solid waste suitable. This preprocessing includes size reduction, air classification, screening, and magnetic separation. Size reduction is necessary to provide a particle size suitable to microbial attack during the compost process. It also reduces bulky

refuse to a size required for the operation of the separation process.

The separation processes of air classification, screening, and ferrous removal separate heavy items from light items, inorganic materials from organic materials, and remove ferrous materials from the waste stream. The costs associated with these processes are usually a function of the required product characteristics for the market place. In general, raising the quality of the product raises the price and decreases the quantity of the product obtained.

Several small pilot projects have demonstrated the viability of the co-composting static pile process and the high rate process. Co-composting is considered to be economical in rural areas with volumes less than 100 tpd using a low-tech static pile system. One large scale facility, the Delaware Reclamation Project in New Castle, owned by the Delaware Solid Waste Authority and operated by Raytheon, was designed and began operations as a 1,000 tpd RDF facility in 1983. At this time, approximately 50 percent of the feedstock is used in mass burn modular incinerators for power recovery. Aluminum and ferrous recovery is approximately 0.3 and 3 to 5 percent, respectively. Approximately 20 percent of the heavy organic fraction (200 tpd) is combined with sewage sludge in a ratio of 1:1.

Municipal solid waste has also been used as a bulking agent for sludge composting, but it is inferior to wood chips. A problem associated with the use of solid waste as a bulking agent is poor structural strength, which results in the tendency of the sludge/solid waste mixture to settle.

Compost Feed Stock Materials

Compost feed stock materials from the municipal solid waste stream originate from three fractions:

- o Yard and wood waste
- o Lake weeds
- o Heavy organic fraction
- o Entire organic fraction

Yard and Wood Wastes. Yard wastes, if collected separately, may be composted using static-pile or windrow techniques to yield a peat-like soil amendment. Woody wastes require chipping prior to mixing with other yard wastes or the chips can be used alone for landscaping.

Successful leaf and yard waste composting operations have been cited in states such as Michigan, New Jersey, Minnesota, California, North Carolina, Pennsylvania, Connecticut and Massachusetts. More than 200 leaf and yard composting sites currently operate in New Jersey, and operations have been so successful that recently passed legislation prohibits landfills from accepting leaves. Problems encountered in the development of the composting operations included lack of available land in urban areas, odors due to improper operation of the facilities, and leachate control. All of these problems are correctable if the system is managed properly. The lack of available land can be addressed by operating regional facilities. Markets cited by the leaf and yard waste composting industry include:

- o Commercial landscapers and nurseries
- o Weed abatement/ground cover
- o Boiler fuel
- o Soil amendment
- o Landfill cover
- o Plantings in greenhouses
- o Garden mulch, and
- o Given away to residents

Organic Fractions. The heavy organic fraction of the waste stream may be recovered using unit processes employed in developing RDF.

This process is specifically employed at the Delaware Reclamation Plant. The recovered heavy organics are mixed with sewage sludge at about a 1:1 ratio. The mix is processed in high rate aerobic digesters, dried, and then screened. In this process, the solid waste fraction is essentially used as a bulking agent in the sewage sludge composting operation. The finished product may be used as a fertilizer blend, soil amendment, or in hydro seeding applications, but it is typically landfilled.

The entire organic fraction of the waste stream has also been subject to composting using either a "high rate" process, employing mechanically assisted digestion or windrow "natural rate" decomposition. Both processes normally include the application of sewage sludge to enhance bacterial decomposition activity. Prior to marketing, the noncompostible materials must be screened. The only operating facility of this type is located in Delaware and uses the heavy organic fraction of the waste stream. Other facilities attempting to use the entire organic fraction of the waste stream have been unsuccessful.

Marketing

As with all materials recovery systems, the success of the operation is dependent on the availability of product markets. Existing markets are not established for composted municipal solid waste. Historically, marketing compost materials has been problematic to the success of the operation, and many times most of the material has been landfilled (75 percent in the Delaware project). However, potential markets similar to the sludge compost markets include:

- Landfill cover
- Fertilizer blenders
- Landscaping and ornamental horticulture
- Stripmine reclamation
- Institutional users
- Citrus growing, and

- Nursery

Successful marketing requires proof that the quality of compost will satisfy the market's needs.

4.6.5 CHIPPING

To minimize quantities of arboreal wastes to be disposed, all wood waste except stumps is chipped prior to delivery to the disposal site, or a chipper is provided on site for processing all wood waste under 20 inches in diameter, except for stumps. The use of wood chips, firewood, and any other beneficial use of wood waste or wood waste products are also encouraged. The success of such a program reduces the quantity of wood wastes requiring disposal.

5.0 RECYCLING PLANNING FOR THE COUNTY

This chapter discusses recycling activities as of May 1989 in the County and the methods for increasing the materials recycled, thereby decreasing the County's dependence on landfills and waste-to-energy facilities. It is important to note that recycling efforts are continually increasing in the County and other programs are continuously being added in many communities.

Recycling programs are a required element of the Plan. Appendix A contains the detailed study of the composition of the County's waste stream, which contributed to the development of the recycling program. Section 8 discusses the implementation details for the County's recycling program.

The County's recycling objective is:

> Establish a program for waste reduction, reuse, recycling and composting that results in the reduction of solid waste to be incinerated or landfilled by at least 30 percent by 1995 and 50 percent by 2005.

5.1 RECYCLING ACTIVITIES IN OAKLAND COUNTY

A number of communities in the County have some form of solid waste source separation recycling program. All collect or accept only source-separated residential materials. Although they collectively do not process a large tonnage of material, they illustrate the potential for recycling. On-going programs in Birmingham, Huntington Woods, Pontiac, and the Village of Holly are discussed below. Other municipally-sponsored recycling programs include:

- City of Madison Heights Drop-Off center, located near the Public Works Building, accepts newspaper, glass, and some

plastics 24 hours/day. Used motor oil is collected Monday through Friday (7:00 a.m. to 4:30 p.m.).

- Commerce Township - Multi-lake Conservation Association is operating an unstaffed drop-off center for newspaper and glass on Newton Road off Oakley Park Road. Glass must be color-sorted. Available to local residents only. Open 24 hours/day.

- Royal Oak Recycling Center collects newspapers, glass, plastic containers and household batteries. Located at the Dept. of Public Services. Open 24 hours/day.

- Clawson Recycling Center, located at the DPW Garage, collects glass, newspapers, plastics and household batteries. Open 24 hours/day.

- St. Joseph grade school in Orion Township operates an unstaffed newspaper drop-off center during daylight hours.

- First Congregation Church of Rochester holds a paper drive for the collection of newspaper and returnable bottles five times a year.

- Southfield Parks and Recreation Department operates an unstaffed drop-off center for newspapers during daylight hours.

- SOCCRA operates a white goods and scrap metal recovery program at its incinerator site in Madison Heights and a leaf transfer and sheet composting operation at its landfill.

Eagle Valley Landfill, the City of Pontiac, and several commercial operations also participate in recycling efforts. These programs are briefly described below.

5.1.1 RECYCLING CENTER OF BIRMINGHAM

The recycling center, located on City of Birmingham property, is open for three hours each Saturday. It is staffed mostly by volunteers, but some paid staff help citizens unload their vehicles. In operation for 11 years, the center required some subsidies to get started, but it is essentially self-sustaining now. The City supports the program by providing space for the Center and liability insurance. The Center accepts glass (sorted by color), bundled newspapers, bundled corrugated paper board, steel, aluminum, and plastic.

5.1.2 HUNTINGTON WOODS

The Huntington Woods recycling program operates a drop-off center in the City Hall parking lot which is open weekdays for plastics, glass and used motor oil only, and the first Saturday of the month for all recyclables including newspapers. A used motor oil drop-off tank is located behind the City offices, and curbside leaf pickup is provided in the fall. The leaves are sent to SOCCRA for use as cover material at its landfill. The City received a Clean Michigan Fund grant and has implemented a pilot grass clipping pickup program.

5.1.3 VILLAGE OF HOLLY

The Village of Holly started a regional pilot recycling program in the spring of 1988. It has now been expanded to curbside source separated pickup throughout the community. A drop off center is maintained for materials from surrounding communities and extra materials from Village residents. The collected materials initially were newspaper and glass, and plastic has been added with aluminum and tin to be added at a later date. A pilot paper collection program has begun in the schools and municipal offices. Tree limbs and brush are collected in an "Adopt a Municipal Truck" program and chipped for park and cemetery mulch. Used oil centers are at designated gas stations. A pilot co-composting project is underway, and the Village has offered space to the County for a Regional Composting Center. Pollard Disposal, contractor for Holly,

has given the community a 60 cent per stop diversion credit as a result of their recycling program.

5.1.4 CITY OF PONTIAC

The City has for many years offered a separate white goods collection to residents. The white goods are taken to a local scrap metal dealer for recycling. The City of Pontiac currently participates in a fall leaf collection program in which the leaves are sent to a private nursery for use as mulch. Additionally, the City is investigating the feasibility of implementing a drop-off center for certain recyclables and intends to implement an office paper collection program in City offices.

5.1.5 EAGLE VALLEY LANDFILL

The Eagle Valley Landfill in Orion Township established a recycling center for paper and white goods in September 1987. The center accepts newspaper, plastic containers, and recyclable white goods (large appliances) during regular business hours on Fridays and Saturdays and offers a discount rate to noncommercial vehicles who recycle.

The proceeds from recycled materials are donated to local charitable organizations. Nearly all of white goods coming to the landfill are recycled. The center also assists local charitable organizations in conducting paper drives and the proceeds are donated to the sponsor organization. The center participates in special events such as Free Disposal Day for Orion Township and The Rouge Rescue.

The recycling center hopes to reinstate a glass and corrugated container recycling program if demand warrants it.

5.1.6 COMMERCIAL RECYCLING

A number of commercial recycling operations also exist within the County:

- Confidential Records Destruction Service, Inc. destroys records for law offices, banks, laboratories, high technology firms and a number of related businesses in the County. The shredded, pulverized and baled paper is sent to mills in Michigan, Illinois and Wisconsin for recycling.

- JSL Services, Inc. of Bloomfield Hills will shred pallets and selected wood waste streams on-site with their portable tub grinder and materials handling system.

- Recycled Polymers, in Madison Heights, accepts clean milk jugs and other HDPE containers, baled, shredded or loose.

- Royal Oak Waste Paper, in the City of Royal Oak, accepts newsprint, old corrugated containers and high grade office papers during business hours at its paper baling facility near downtown Royal Oak.

- The St. Julian Wine Tasting Center near Holly, Michigan pays five cents for each St. Julian bottle which is returned to the Center.

- Scrap Metal Dealers: Approximately 15 metal and junk dealers buy and process metals, automobiles, appliances, batteries, radiators, and medical x-rays. One of the largest scrap dealers in the area is Standard Lead Co., Inc. This firm handles an estimated 30,000 to 35,000 tons of non-ferrous metals (copper, brass, aluminum, zinc, lead, stainless steels) each year. Allen & Sons, Inc. in Pontiac is another major scrap metal dealer in the area.

Appendix A contains additional information on materials reuse opportunities within Oakland County.

5.2 RECYCLING PROGRAM STRATEGY

The County is aware of the State goals for the disposal of solid waste.[1] It concurs with them, except the County has adopted the long-term objective of 50 percent by 2005 for waste reduction, reuse, composting, and recycling.

5.3 LONG-TERM STRATEGIC PLAN FOR RECYCLING IN OAKLAND COUNTY

Section 8 of this Plan discusses the recycling program implementation plan for Oakland County. Below is a brief description of the work done to provide the basis for the implementation plan.

5.3.1 OVERVIEW

Meetings have been held with concerned citizens and organizations and policy makers to develop the recycling program. Decisions regarding educating the public and the passage of State and County statutes have been made. Data describing the County and its communities are constantly being assembled, analyzed and acted upon.

1/ The statewide solid waste management strategy targets the following recovery rates:

Technology	Percentage of Waste Stream
Waste Reduction	10
Recycling	25
Composting	10
Incineration/Waste-to-Energy	40
Landfill	15

Source: MDNR 1987 Assessment

5.3.2 RECYCLING AND COMPOSTING SYSTEM DESIGN

The County has received bids for the construction and operation of a recycling facility capable of processing 400 tons per day of recyclable materials. Additionally, one or more County composting facilities will operate, capable of processing 550 tons per day, six days per week of yard waste, wood waste, and lake weeds.[2] Refer to Section 8 for a more detailed description of the County's recycling and composting program.

5.3.3 END USES AND MARKETS

The end uses and markets available to the County and its municipalities for all materials described in the previous section are discussed in Appendix A. These end uses and markets are described in terms of:

- Market specifications
- Location, distance, name of specific facilities
- Required transportation arrangements and costs
- Range of market demand and pricing

5.3.4 RECYCLING AND COMPOSTING OPTIONS FOR OAKLAND COUNTY

The County hired a recycling consultant to present waste reduction, reuse, composting and recycling options. The consultant has provided a recycling study and recommendations for incorporation in the County's solid waste program. The main features of these recommendations have been adopted for implementation.

2/ On an annual average, this design capacity amounts to approximately 300 tons per day.

5.3.5 CONCEPTUAL PROGRAM DESIGN

The solid waste program adopted by the County places a maximum reliance on the disposal methodologies of waste reduction, reuse, composting, and recycling. The County's role in this program will be that of coordinator, educator, and administrator of the unified system.

5.4 IMPLEMENTATION PLANS FOR RECYCLING IN THE COUNTY

Currently, few solid waste recycling programs are operating in the County. The County wants to reduce the amount of solid waste to be incinerated or landfilled by a minimum of 30 percent by 1995 and 50 percent by 2005 - a goal that obviously will require a much higher level of recycling, plus waste reduction, reuse, and composting.

The County has evaluated its options and decided to blend private, municipal, and County-owned facilities. This configuration will be supported by on-going public education and possibly incentives. Further, lack of market availability for recycled products was identified as a factor that could potentially weaken recycling programs in the future. The County recognizes that procurement of goods made from recycled materials is an important means to stimulate markets for recycled products and is studying its procurement guidelines to implement the policy of encouraging procurement of goods made from recycled materials. Additionally, it will support new federal and state legislation mandating the purchase and use of recycled materials by manufacturers.

Section 8 describes the waste reduction, reuse, composting and recycling programs proposed in detail.

6.0 CURRENT MANAGEMENT SUBSYSTEMS

Act 641 requires that the County's proposed Plan be approved by the Board and endorsed by the governing bodies of at least 67 percent of the municipalities within the County before the Plan may take effect. Thus, understanding the solid waste disposal issues affecting each community is imperative to the success of the County's Plan.

Three solid waste subsystems currently operate within the County's overall system:

- Southeastern Oakland County Resource Recovery Authority (SOCRRA) (formerly SOCIA)
- City of Pontiac
- The Resource Recovery and Recycling Authority of Southwest Oakland County (RRRASOC)

Most of the communities outside of SOCRRA, Pontiac and the RRRASOC belong to the Municipal Solid Waste Board (MSWB).[1]

To effectively integrate all of the County communities into a County-wide solid waste management plan, the operating structure and current and future needs of the operating and planning subsystems must be examined. In the following sections, each management subsystem is described in terms of participating municipalities, waste quantities and characteristics, current and future disposal practices, and special needs and considerations.

6.1 SOUTHEASTERN OAKLAND COUNTY RESOURCE RECOVERY AUTHORITY (SOCRRA)

6.1.1 WASTE QUANTITY AND CHARACTERISTICS

The SOCRRA accepts most residential and some commercial waste generated within its District. Waste quantities received by SOCRRA from its

1/ Figure 6.2-1 illustrates the location of communities belonging to these waste management and planning subsystems. This figure is located at the end of Section 6.

members range from 1.87 to 13.95 pounds per household per day and average 10.02 pounds per household per day for all member communities.

Solid waste generation within SOCRRA communities is expected to increase over 10 percent over the 20 year planning period. Industrial waste generation is expected to increase only 4 percent over the 20-year period, and commercial waste generation is expected to increase nearly 40 percent. Waste generated in SOCRRA's communities represents approximately 30 percent of the waste generated in the County.

6.1.2 CURRENT DISPOSAL PRACTICES

SOCRRA's incinerator located in Madison Heights is not currently operating. However, SOCRRA's transfer facility and landfill are being used. SOCRRA operates a landfill located in Rochester Hills, and transfer stations located in the City of Troy and at the former incinerator site that currently transfer waste that cannot be handled by the inoperable incinerator to landfills located throughout the region using the services of Browning Ferris Industries and City Disposal. The landfill site had received the incinerator ash and unprocessed refuse from the district when the incinerator was in service. Currently the landfill is being used for minimal waste disposal and for a composting site. SOCRRA now exports its municipal solid waste to other landfill facilities, principally in Washtenaw, Wayne and Macomb Counties, and will continue to do so until it has an operating waste-to-energy facility. Appendix B contains a discussion of SOCRRA's current and future waste management plans.

6.1.3 FUTURE PLANNED DISPOSAL PRACTICES

Two materials separation programs are planned by SOCRRA. Assuming the waste-to-energy becomes operational, 40 tons per day of ferrous and non-ferrous materials will be separated from the ash prior to disposal. Member communities have source separated leaves for the past 18 years, and SOCRRA is beginning the composting of grass as well. SOCRRA is in the process of establishing a MRF at their transfer station site to process recyclable material collected by member municipalities and

private haulers. SOCRRA plans to achieve a 25 percent recycling rate by 1995 through processing 400 tons per day of separated materials. SOCRRA plans to divert another 15 percent of the waste stream through composting.

SOCRRA plans to use their landfill expansion as an ash monofill. The currently permitted landfill had an estimated remaining life of 1 to 1.5 years as of March 1988, (refer to Section 3 for discussion).

SOCRRA has applied for a permit to expand the landfill on 57 acres north of Avon Road. SOCRRA has designated a design team to develop design plans and specifications for the ash monofill. Assuming operation of the waste-to-energy facility, the 57 acres would provide approximately 25 years of life as an ash monofill. Additional landfill capacity will be required by SOCRRA for bypass and nonprocessible waste.

SOCRRA is planning to complete the retrofitting of its incinerator by 1993. The facility will have the capacity to process 575 tons per day, including 40-100 tons per day of bulky wood wastes shredded on-site.

6.1.4 TECHNICAL, ADMINISTRATIVE, FINANCIAL AND LEGAL CAPABILITIES

SOCRRA possesses the technical, administrative, financial and legal capabilities required to operate its current system effectively and to operate its future planned system. Although currently SOCRRA is exporting its waste to landfills within and outside the County, with implementation of its landfill, waste-to-energy and recycling facilities and continued operation of its transfer station and compost facilities, SOCRRA will be in a position to manage its entire waste stream. Should SOCRRA require the County's assistance in any facet of its solid waste program, the County will work with SOCRRA to find mutually-acceptable solutions.

6.2 CITY OF PONTIAC

6.2.1 BOUNDARIES OF COLLECTION/DISPOSAL

The City of Pontiac (the "City") is a "closed system" of waste generation, collection, and disposal: all residential and some commercial wastes generated within the incorporated limits of the city are collected and disposed within the city.[2]

6.2.2 WASTE QUANTITY AND CHARACTERISTICS

Total waste generation in the City is anticipated to increase approximately 5 percent over the 20-year planning period. During this 20-year period, residential waste generation is expected to remain the same, industrial waste generation is expected to increase about 7 percent and commercial about 11 percent. Waste generation within the City represents approximately 10 percent of the total waste generated in the County.

6.2.3. CURRENT DISPOSAL PRACTICES

The City currently disposes of residential, commercial, industrial, and institutional wastes generated within its limits at the City of Pontiac Collier Road Sanitary Landfill. No wastes are accepted from outside the corporate city limits.

A major portion of the construction/demolition wastes (Type III) generated in the City is collected by private haulers and disposed at other facilities both within and outside of Pontiac and the County.

2/ Figure 3.3-1 shows the boundaries of the City of Pontiac, and the location of the City of Pontiac Collier oad Landfill, where the City's waste is disposed. This figure is located at the end of Section 3.

6.2.4 FUTURE PLANNED DISPOSAL PRACTICES

The current design capacity of the City of Pontiac Collier Road Landfill is anticipated to meet the City's Type II waste disposal needs for approximately 13 years (refer to Section 3). The City is planning a lateral expansion of the landfill to the north of the existing site that would add another 8 years of life to the facility. An engineering study performed in 1985 stated that this expansion appeared feasible. Appendix B contains a description of Pontiac's future plans.

The City is also exploring waste reduction and recycling methods that could reduce the amount of waste landfilled by 25 to 40 percent. The success of these programs would ensure adequate disposal volume for the City's Type II wastes at the City of Pontiac Collier Road Landfill beyond the year 2010.

Private haulers will continue to dispose of Type III waste.

6.2.5 ADDITIONAL CONSIDERATIONS

Based on data collected for the City of Pontiac Collier Road Landfill, anticipated waste generation rates in the City and future plans for landfill expansion and waste reduction, the City appears to have sufficient disposal capacity for the 20-year planning period.

As noted in Section 3, waste volumes received at the landfill decreased from 1985 to 1986 because industrial facility shutdowns eliminated the need to dispose of foundry sand and fly ash. The City anticipates further decreases in waste generation, until landfilling stabilizes at 180,000 in-place cubic yards per year. In 1986 the landfill accepted 312,700 in-place cubic yards.

6.2.6 TECHNICAL, ADMINISTRATIVE, FINANCIAL AND LEGAL CAPABILITIES

The City of Pontiac possesses the technical, administrative, financial and legal capabilities required to operate its current system

effectively and to operate its future planned system. Should Pontiac require the County's assistance in any facet of its solid waste program, the County will work with the City to find mutually-acceptable solutions.

6.3 MUNICIPAL SOLID WASTE BOARD (MSWB)

6.3.1 PARTICIPATING COMMUNITIES

Thirty County communities formed the MSWB to work with the County in implementing the Plan; currently, 28 continue to belong to the MSWB.[3] The County and the MSWB communities signed an intergovernmental agreement, which defined the responsibilities and authority of each party. A representative from the Board is also on the MSWB. Upon execution of the Intergovernmental Agreement (IGA) described in Section 8.7 herein, the MSWB will be dissolved.

6.3.2 WASTE QUANTITY AND CHARACTERISTICS

Approximately 30 percent of the solid waste generated in the County comes from municipalities belonging to the MSWB. Waste generation within the MSWB municipalities is expected to increase 40 percent over the 20-year planning period. Approximately 60 percent of the waste generated within MSWB communities comes from residential sources.

6.3.3 CURRENT DISPOSAL PRACTICES

These communities currently dispose of their waste through municipal or private contracts with haulers. These haulers take the collected waste to the disposal site of their choice, typically a landfill that is convenient to the hauler's collection site, including Wayne Disposal -- Oakland Landfill, the Waterford Hills Landfill, Eagle Valley Landfill, Lyon Development Landfill, and landfills in Genesee County.

3/ Refer to Figure 6.2-1, located at the end of Section 6, for an illustration of MSWB communities.

6.3.4 FUTURE PLANNED DISPOSAL PRACTICES

The MSWB planned for the development of a waste-to-energy facility to accommodate its members. The County is now implementing this facility, as discussed in detail in Section 8. Should communities decide not to join the County's waste management system (described in Section 8), they will be responsible for their own waste.

6.3.5 TECHNICAL, ADMINISTRATIVE, FINANCIAL AND LEGAL CAPABILITIES

MSWB communities posses limited technical, administrative, financial and legal capabilities to manage their waste stream on their own. Although some communities license waste haulers, most do not. MSWB communities have not adopted flow control ordinances directing waste to a designated facility, and most communities have not adopted source separation ordinances. These capabilities will have to be exercised by each MSWB community that joins the County system and signs the Intergovernmental Agreement described in Section 8.7.

6.4 RESOURCE RECOVERY & RECYCLING AUTHORITY OF SOUTHWESTERN OAKLAND COUNTY (RRRASOC)

6.4.1 PARTICIPATING MUNICIPALITIES

RRRASOC currently consists of City of South Lyon, City of Southfield, City of Novi, City of Farmington, City of Farmington Hills, City of Walled Lake, City of Wixom, and Lyon Township. All collection will be maintained within these boundaries. Should other communities decide to join, these boundaries will be expanded.

6.4.2 WASTE QUANTITY AND CHARACTERISTICS

Total waste generation in RRRASOC is anticipated to increase over 30 percent during the 20 year planning period. This is due to the * anticipated growth in the western portion of RRRASOC's boundaries. RRRASOC generates over 25 percent of the County's total waste. Residential waste contributes 30 percent; commercial about 40 percent; and industrial nearly 25 percent of RRRASOC's total waste stream.

6.4.3 CURRENT DISPOSAL PRACTICES

The Authority currently disposes of wastes through private industry/collection contracts. The waste is delivered to landfills within Oakland, Washtenaw and Wayne Counties, including Arbor Hills and Lyon Land Development. RRRASOC communities have recycling drop-off facilites for newspaper, glass, plastic, oil and batteries at each of their respective city/township complexes.

6.4.4 FUTURE PLANNED DISPOSAL PRACTICES

RRRASOC is proposing a Materials Recovery/Transfer Station Household Hazardous Wastes Facility sized for handling 500 tons per day of recyclable materials. The Authority intends to meet the following volume reduction goals by the year 2010:

	Percent
Reduction/Reuse	10
Compost	5
Recycling	35
	50

6.4.5 TECHNICAL, ADMINISTRATIVE, FINANCIAL AND LEGAL CAPABILITIES

RRRASOC is currently increasing its technical, administrative, financial and legal capabilities. Collection contracts will be licensed through RRRASOC to establish flow control and to direct waste to designated facilities. All waste generators will be included in these contracts: single family residential, multi-family residential, commercial and industrial. RRRASOC currently plans to use the County system for

disposal of waste that cannot be handled by its own facility. Should RRRASOC require the County's assistance in any other facets of its solid waste program, the County will work with RRRASOC to find mutually-acceptable solutions.

6.5 REMAINING OAKLAND COUNTY COMMUNITIES

6.5.1 MUNICIPALITIES

The previous sections describe SOCRRA, Pontiac, the MSWB, and RRRASOC. These include 51 of the 61 civil divisions in the County. The remaining 10 municipalities[4] not belonging to MSWB, SOCRRA, RRRASOC or served by the City of Pontiac, must also be part of the County's solid waste planning efforts.[5]

6.5.2 WASTE QUANTITY AND CHARACTERISTICS

Waste generation in the 9 municipalities (less City of Northville[5]) represents approximately 2 percent of all waste generated in the County. Over the 20-year planning period, solid waste generation in these 9 municipalities is expected to increase approximately 50 percent. Residential waste contributes just over 30 percent to the total waste stream, commercial waste contributes nearly 60 percent to the total solid waste stream, and industrial waste contributes approximately 10 percent to the total waste stream.

6.5.3 CURRENT DISPOSAL PRACTICES

The 9 communities currently dispose of their refuse through municipal or private contracts with waste hauling companies. As with the MSWB communities, private haulers transport the waste to a convenient waste disposal site, including the Wayne Disposal -- Oakland Landfill, the

4/ Refer to Figure 6.2-1, for an illustration of the remaining communities.

5/ Northville is partially located in Wayne County and has requested to be included in Wayne County's Solid Waste Management Plan. Thus, waste generated within Northville is not considered in the County's Plan.

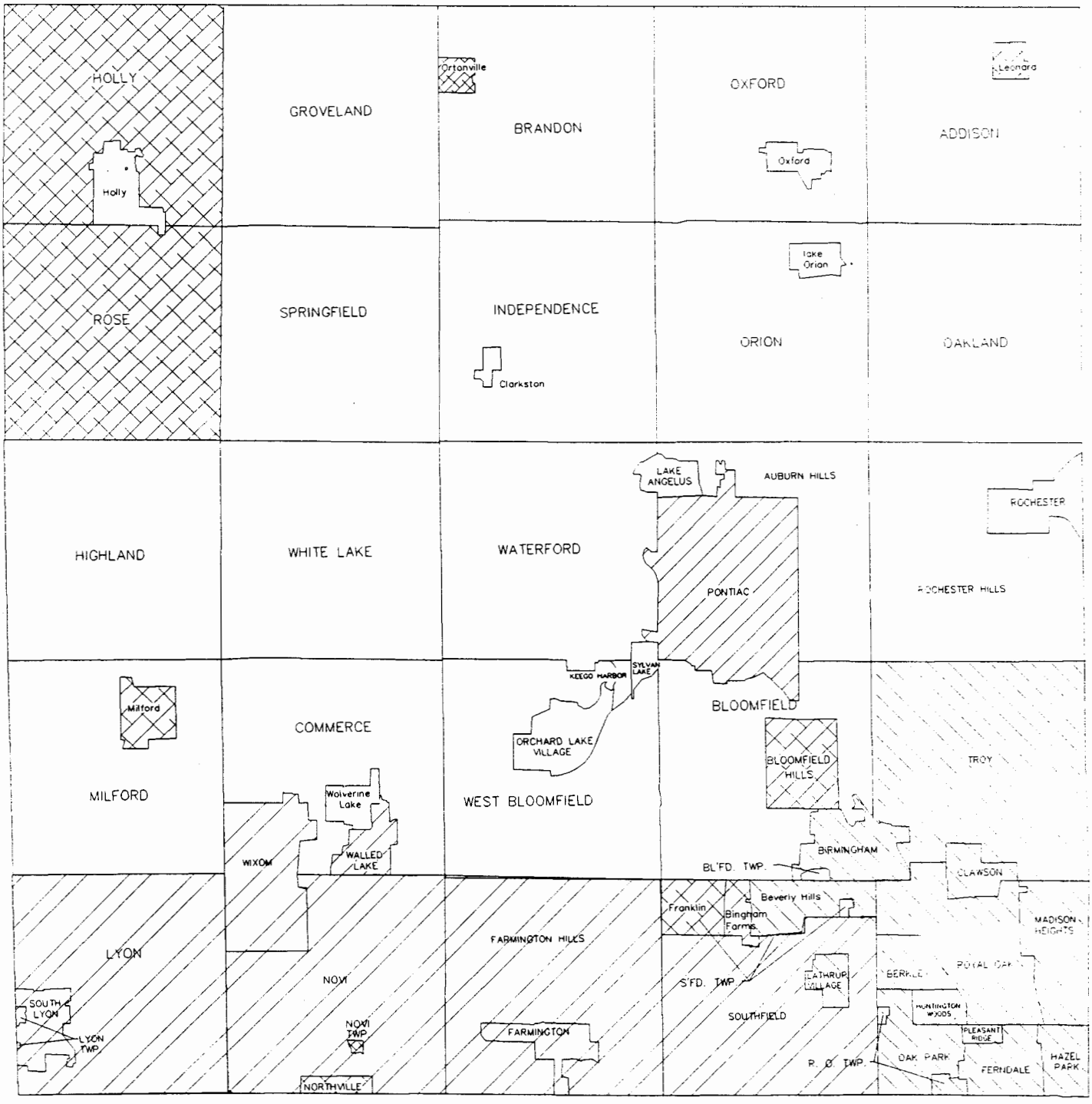
Eagle Valley Landfill, the Lyon Development Landfill, the Waterford Hills Landfill, and landfills in Genesee and Washtenaw Counties.

6.5.4 FUTURE PLANNED DISPOSAL PRACTICES

Future solid waste disposal in these 9 municipalities will be handled in one of three ways: they will join the County waste management system described in Section 8 and commit their refuse to the facilities being planned by the County, they will join another system operating within the County or they will be responsible for their own waste. As discussed in Section 3.3, the total life remaining for permitted, operating landfills in Oakland County is 6.2 years as of March 1988. However, many of the 9 communities dispose of their waste out of the County

6.5.5 TECHNICAL, ADMINISTRATIVE, FINANCIAL, AND LEGAL CAPABILITIES

The remaining communities possess limited technical, administrative, financial and legal capabilities to manage their waste stream on their own. Although some communities license waste haulers, others do not. The communities have not adopted flow control ordinances directing waste to a designated facility, and most communities have not adopted source separation ordinances. These capabilities will have to be exercised by each community that joins the County system and signs the Intergovernmental Agreement described in Section 8.7.



LEGEND

- Municipal Solid Waste Board
- City of Pontiac
- SOCRRA
- Remaining Communities
- RRRASOC

FIGURE 6.2-1

DISPOSAL SUBSYSTEMS IN OAKLAND COUNTY, MICHIGAN

7.0 ANALYSIS OF SOLID WASTE MANAGEMENT ALTERNATIVES

The primary goal of the Plan, in line with the statewide Solid Waste Management and Reduction Policy, is to create an integrated waste management system to dispose safely and efficiently of all non-hazardous waste produced by the residential, commercial, and industrial waste generators in the County. This system will provide optimal environmental protection by maximizing waste reduction and reuse, composting and recycling, and minimizing the need for waste-to-energy and landfilling.

The available waste reduction and disposal technologies are evaluated in this section, giving consideration to the state and County solid waste disposal goals. Alternatives for waste management have been divided into short- and long-term options. Short-term is the five-year planning period, 1990-1995. The long-term plan extends through the 20-year planning period, 1990-2010. It should be noted, however, that the County intends to reach its long-term goal of 50 percent reduction of the waste stream by 2005.

7.1 ANALYSIS OF DISPOSAL TECHNOLOGY ALTERNATIVES

The Act 641 rules require that disposal alternatives developed in the Plan be evaluated in terms of public health, economic, environmental, siting and energy impacts. The following analysis of disposal alternatives incorporates evaluation of these considerations, in that the hierarchy selected reflects the State Solid Waste Policy, and in that specific discussions in the following sections, especially Section 8.0, address these evaluation issues.

Short-term disposal alternatives must adequately handle solid waste for the first five years of the planning period. Short-term solid waste management should be directed toward minimizing existing waste disposal problems and encouraging future disposal goals.

Currently, operating, permitted landfills within the County have total capacity to handle the County's waste until mid-1994 (see Section 3.3). In the short-term, the County will continue to use these facilities and landfills located out of the County as it implements alternatives to landfilling. Figure 7.1-1[1] illustrates the life of currently permitted landfill volume.

Alternative waste management technologies can be combined with landfill disposal to extend landfill life. They are:

- Source reduction and reuse
- Recycling
- Composting
- Waste-to-Energy
- Baling and shredding
- Chipping

Cost estimates for statewide implementation of these programs are provided in the following discussion as a means of comparing relative costs associated with each technology. These costs may be reduced at the County level.

7.1.1 SOURCE REDUCTION AND REUSE

The intent of source reduction is to avoid creating or generating waste. The industrial and commercial sectors can contribute the most to waste reduction, although government and individuals can also practice waste reduction. For example, consumers can choose products with less packaging, or commercial establishments can provide merchandise in bulk or in wrappings and containers that could be recycled or refilled instead of discarded.

1/ All tables and figures referenced in this section are located at the end of Section 7.

Local groups (municipalities, authorities, environmental groups, etc.) can then develop educational programs or financial incentives to promote waste reduction. Following the state goals, the County's long-term waste reduction goal of 50 percent by 2005 includes the components of waste reduction and reuse. It will meet this goal through public education and other programs discussed in Section 8.

The costs of waste reduction and reuse programs arise chiefly from educational programs or financial incentives and are difficult to quantify.

While an extensive educational program will be needed to attain the County's goals, the advantages of source reduction and reuse are: decreases dependence on landfills, reduces disposal costs, eliminates materials from the waste stream, and conserves natural resources.

7.1.2 RECYCLING

Recycling reduces waste, saves energy, protects natural resources, and creates jobs. For example, every ton of paper recycled conserves approximately 3-1/2 cubic yards of landfill space. Recycling reduces dependence on certain virgin materials and contributes to the export market. More than four million tons of site and source separated waste paper were shipped overseas in 1987, and this quantity is expected to double by 2000.

To establish an effective recycling program, the County is planning to gain the involvement, support, and cooperation of the private and public sectors, numerous interest groups, and commercial, industrial, and institutional entities through extensive public education.

The Clean Michigan Fund recycling feasibility studies indicate that the average initial capital cost per ton capacity per day to implement statewide recycling technology is approximately $20,300, including the cost of equipment for materials collection. That is, for a 100 ton per day facility, the cost would be $2,030,000. At the local level these

costs may be reduced through contributions of land and site improvements; sharing equipment, utilities, and office space; and volunteer assistance.

While the effectiveness of recycling depends in part upon citizen cooperation and available markets, the advantages of recycling are: decreases dependence on landfills, reduces disposal costs, conserves natural resources, and creates jobs.

7.1.3 COMPOSTING

Composting yard wastes, brush and lake weeds (using technologies such as the static windrow method) diverts waste from landfills and produces a finished product that is valuable as a mulch or soil conditioner.

Successful implementation of composting programs relies on ordinances, state and local funding assistance, local or state bans on leaf burning, local and state education efforts to promote community awareness and involvement, and marketing the finished product.

The State estimates an initial capital cost of composting of $4,700 per ton capacity per day. That is, for a 50 ton per day facility, the cost would be $235,000. To reduce these costs the County will utilize land already in its possession, use some of the same equipment for all sites, and assign pre-existing County staff to the extent possible.

While composting requires a relatively large piece of land, its advantages are: decreases dependence on landfills, reduces disposal costs, and produces useful product.

7.1.4 WASTE-TO-ENERGY

Combustion of solid waste generally reduces waste to approximately 10 percent of its original volume while recovering energy and protects public health and the environment through state-of-the-art pollution controls. The State estimates that 55 percent of the waste stream will

remain for landfilling and waste-to-energy after waste reduction, reuse, composting, and recycling have been implemented. Waste to-energy facilities represent an opportunity to recover energy from a portion of the waste stream that otherwise would be landfilled.

The County is planning extensive community involvement and education to appropriately address concerns regarding waste-to-energy facilities. Questions about toxic air emissions, fly ash and bottom ash toxicity, and contract rates for selling the energy will be addressed as the project proceeds. All applicable federal, state, and local requirements will be met or exceeded.

The State estimates the initial capital costs to implement statewide waste-to-energy facility programs at an average of $115,000 per ton capacity per day. That is, for a 1000 ton per day facility, the cost would be $115,000,000.

The Westinghouse proposal, which was accepted by the County, was approximately $82,000 per installed ton of combustion capacity per day (or for a 1000 ton per day facility, $82,000,000).

While waste-to-energy has a high capital cost, it reduces dependence on landfills and recovers energy from waste.

7.1.5 BALING AND SHREDDING

Baling and shredding operations increase the density of waste deposited in landfills, thereby extending useful site life 15 to 35 percent. However, this technology involves high overall capital and operation and maintenance costs, great potential for unscheduled downtime, and increased materials handling requirements. Thus, although baling and shredding extend landfill life, they do not greatly reduce or eliminate dependence on landfills. Accordingly, the County determined that the Plan would not include its utilization.

7.1.6 CHIPPING

Chipping reduces the volume of arboreal and brush wastes. While reducing the waste stream, chipping produces a product that has a variety of potential uses. Wood chips frequently are used by municipalities for playgrounds or landscaping, or are sold or given to residents for similar uses. If convenient access to the wood chips is provided, homeowners are often enthusiastic to use the product. Wood chips also can be used as a bulking agent in compost operations or sold for fuel. If the wood chips cannot be marketed, they must be landfilled or incinerated.

Chipping equipment can be used on an as-needed basis. The equipment may be stationary or portable and can be transported along community streets, collecting and chipping wood debris along the route.

Chippers range in cost from $150,0000 to $300,000, depending on the size of the unit.

In brief, chipping diverts material from waste stream or decreases dependence on landfills, has a potential for product reuse, and requires minimal space.

7.2 EVALUATION OF LONG-TERM DISPOSAL TECHNOLOGY ALTERNATIVES

Waste reduction, reuse, recycling, composting (including chipping), waste-to-energy and landfill disposal alternatives will be blended into the County's long-term plan. By maximizing the use of the first four technologies, environmental impacts and reliance on external sources of energy will be minimized and public acceptability and protection of public health will be maximized. Use of waste-to-energy will provide a means of producing energy while reducing waste volumes, thereby reducing the need for large tracts of land for landfilling. This integrated disposal approach is designed to provide the most economically feasible and environmentally safe utilization of disposal alternatives. The following discussion details the analysis of waste management system

alternatives and identifies the most appropriate blend of alternatives for the County.

7.3 ANALYSIS OF SOLID WASTE MANAGEMENT SYSTEM ALTERNATIVES

A solid waste management system often integrates a number of waste management techniques, such as waste reduction and reuse, recycling, composting, landfilling, waste-to-energy or out-of-county disposal. These techniques can be used in various combinations, depending on the County's goals and the waste type and volume that requires disposal.

The County has developed a solid waste program that fulfills and exceeds the State's goals, which incorporates all of the above technologies. Siting of the proposed facilities (discussed in Section 8.2) has considered access to transportation networks to accommodate development and operation of the program.

Currently available permitted landfill volume within Oakland County is rapidly being filled. Table 7.3-1 presents the permitted landfill volume available in the currently permitted, operating landfills. Also shown is available landfill volume if designated unpermitted landfills were included.

If the County were to implement no new solid waste programs or facilities, waste generation and landfilling would continually increase over the planning period to approximately 3.2 million cubic yards in 2010. Operating, permitted landfills would be filled by early 1995, and all other currently designated unpermitted landfill volume would be filled by mid-1999.[2]

2/ Figure 7.3-1, illustrates landfill requirements under this "no-action" scenario.

Both State and County solid waste management goals emphasize reducing dependence on landfills. The State calls for reducing landfilling to 20 percent of the total waste stream by 2005. The County has established a goal of reducing the County's waste by no less than 30 percent by 1995 and 50 percent by 2005 through maximum reliance on waste reduction, reuse, composting and recycling, with minimal reliance on waste-to-energy and landfilling. Additionally, a 2000 ton per day waste-to-energy facility is planned for operation in 1993, and SOCRRA is planning to retrofit its 600 ton per day waste-to-energy facility. The County's Plan will reduce landfilling of residential, commercial, and industrial housekeeping waste to 1 percent by 2005 (not considering process residue).

Figure 7.3-2 illustrates the result of achieving the State's landfilling reduction goal, as set forth in the Statewide Solid Waste Management and Reduction Policy. If the goals set forth in the State policy were met, solid waste requiring disposal in 2010 would be reduced to approximately 779,000 cubic yards; permitted, operating landfills would be filled by the end of 1995, and other designated landfill space would not be filled until mid-2002. It should be noted that the waste considered in this evaluation was limited to Type II waste from residential, commercial, and industrial sources and construction/demolition waste; other waste streams will be discussed in Section 8.

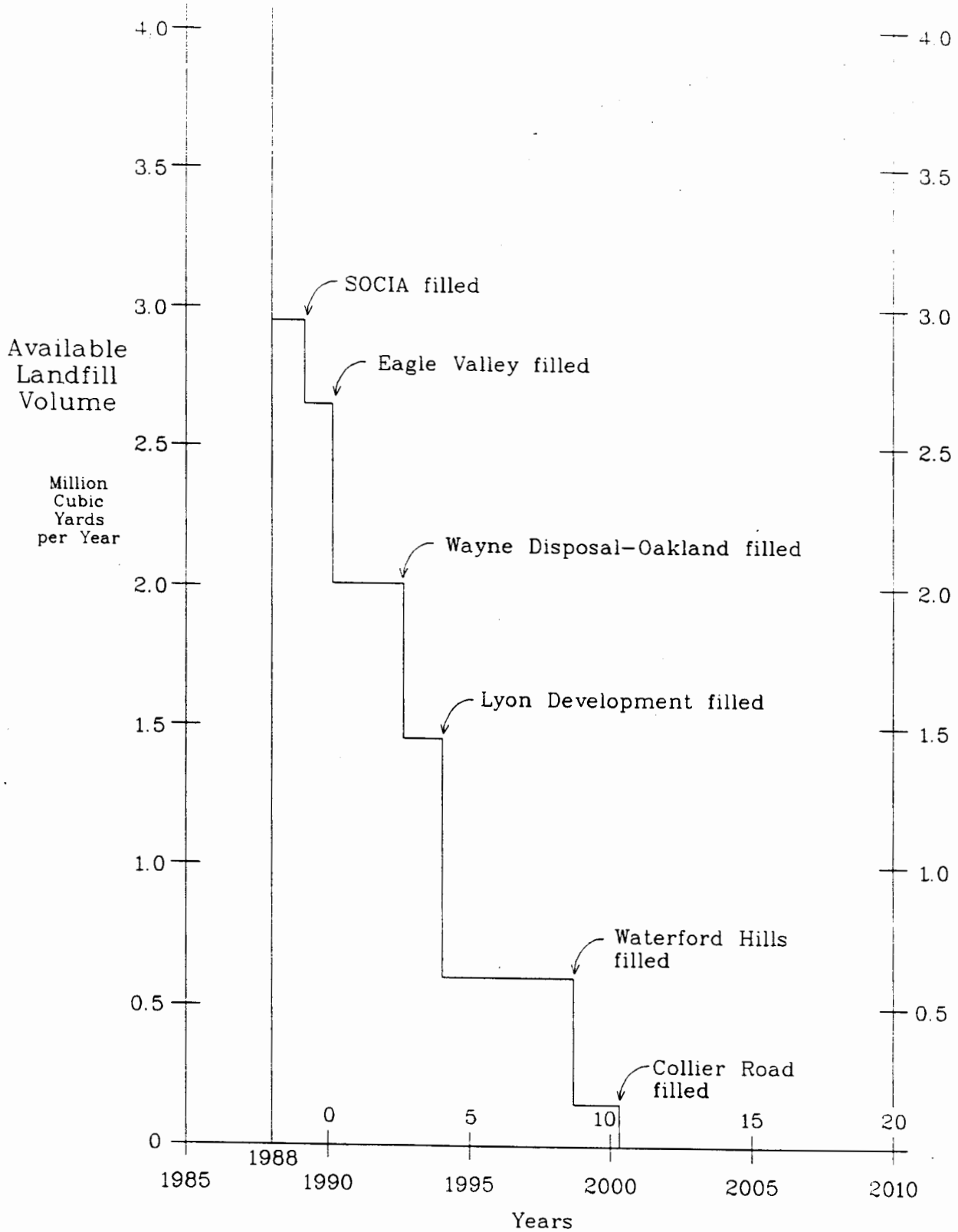
Implementation of the County's Plan meets State goals for total waste stream reduction and reduction of waste landfilled, as shown in Figure 7.3-3. If goals are met, solid waste requiring disposal in 2010 would be reduced to approximately 590,000 cubic yards. Permitted, operating landfills would be filled by the end of 2001 and other designated landfill space would not be filled until long after 2010. It should be noted that the waste included in this evaluation is Type II waste from residential, commercial, and industrial sources, construction/demolition waste and residue produced by the recycling and waste-to-energy facilities. Section 8 discusses other waste streams in the County requiring disposal.

TABLE 7.3-1
LANDFILL VOLUMES
(cubic yards)

	Permitted Operating Volume Available[a]	Currently Unpermitted Designated Volume	Total
City of Pontiac Collier Road	2,348,600	0	2,348,600
Eagle Valley	953,000	8,000,000[b]	8,953,000
Lyon Land Development	6,000,000	0	6,000,000
SOCRRA	260,900	4,050,000[b]	4,310,900
Waterford Hills	5,000,000	0	5,000,000
Wayne Disposal - Oakland	4,000,000	0	4,000,000
Total	18,562,500	12,050,000	30,612,500

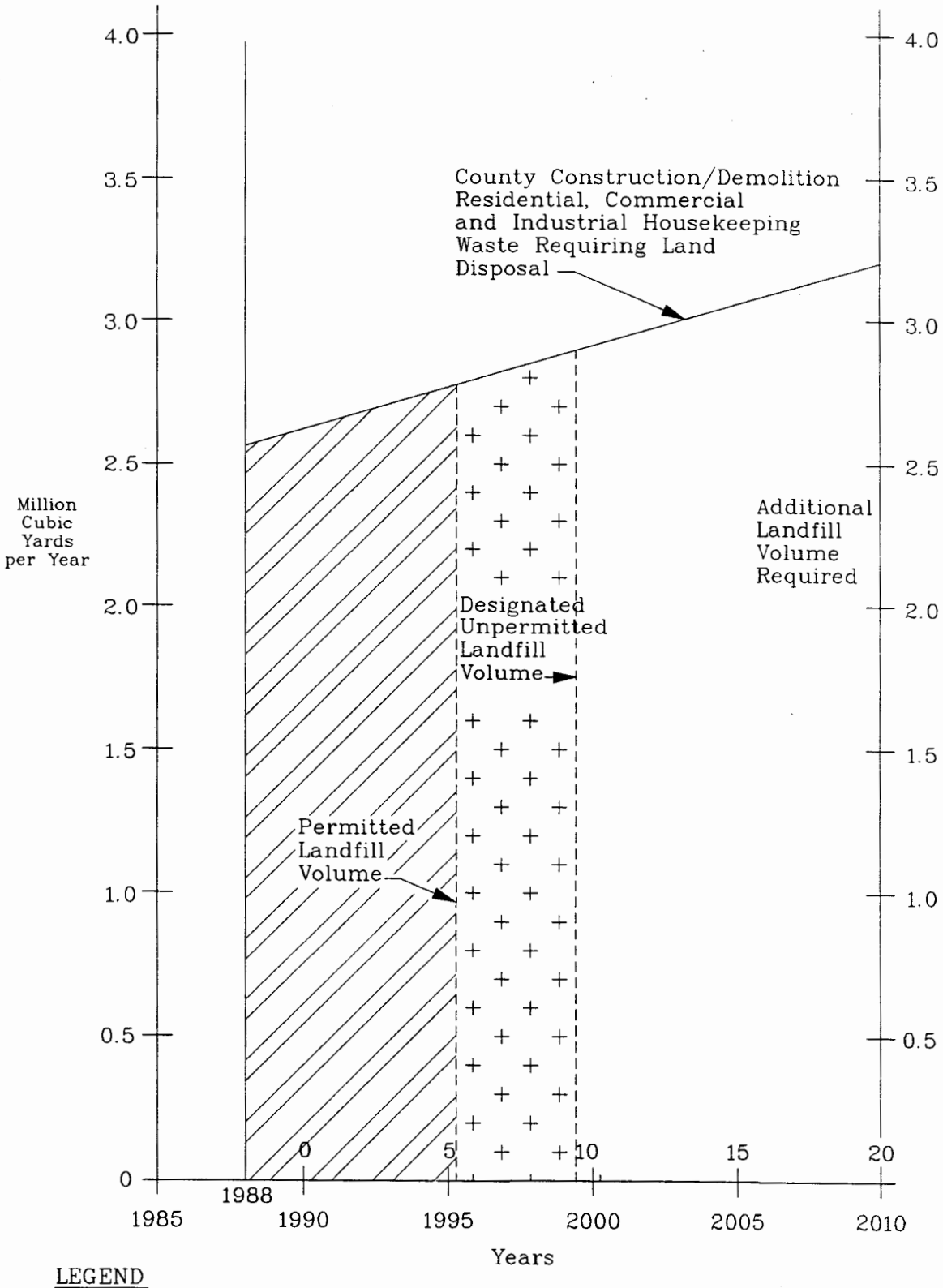
a As reported by landfill operators, March 1988.

b Volume estimates were provided during presentations to the SWPC and follow-up conversations in November 1989.



Note: This figure assumes that the current filling rate will be maintained. This may adjust based on new landfill openings and as facilities close.

FIGURE 7.1-1
Life of Currently Permitted Landfill Volume



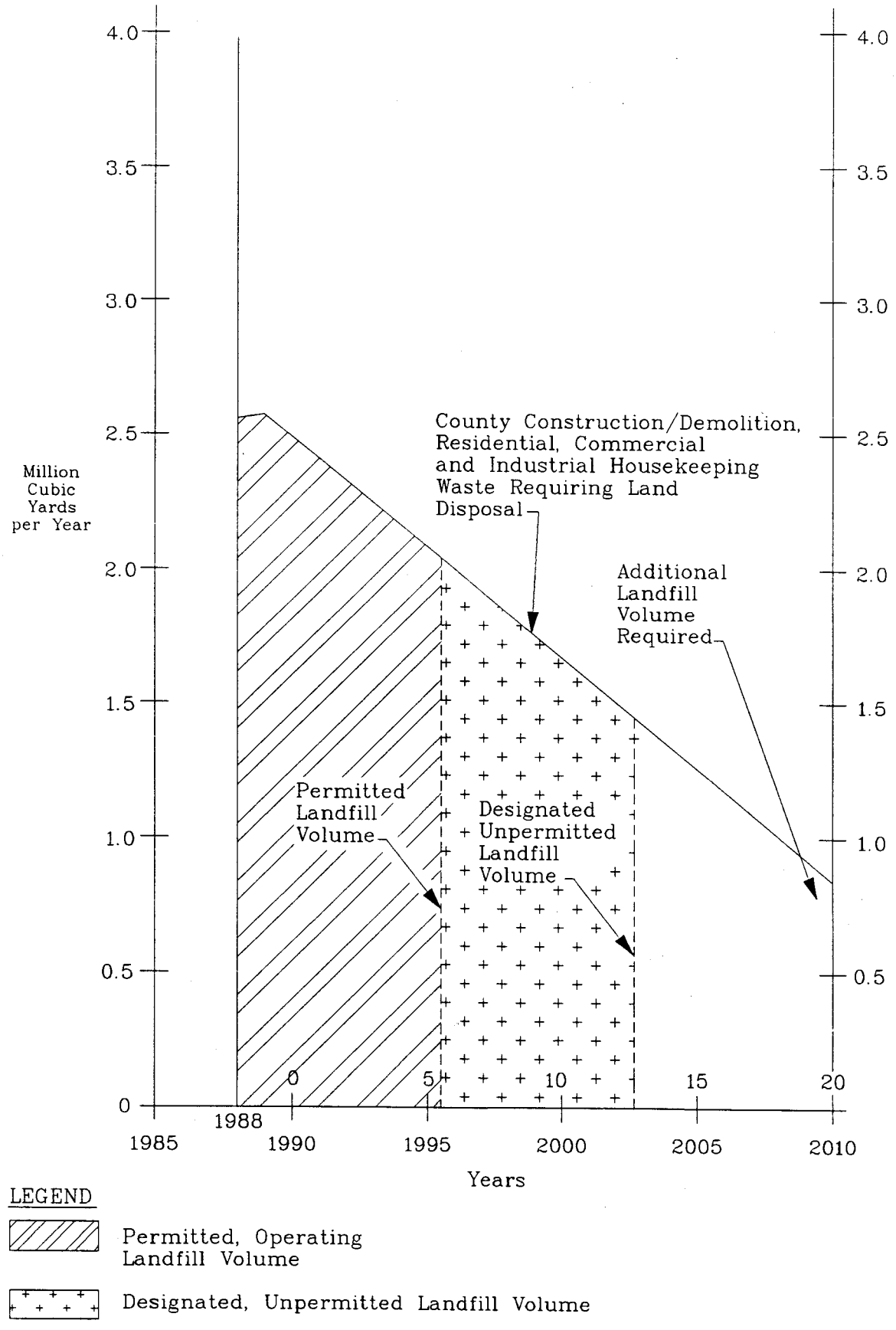
LEGEND

Permitted, Operating Landfill Volume

Desginated, Unpermitted Landfill Volume

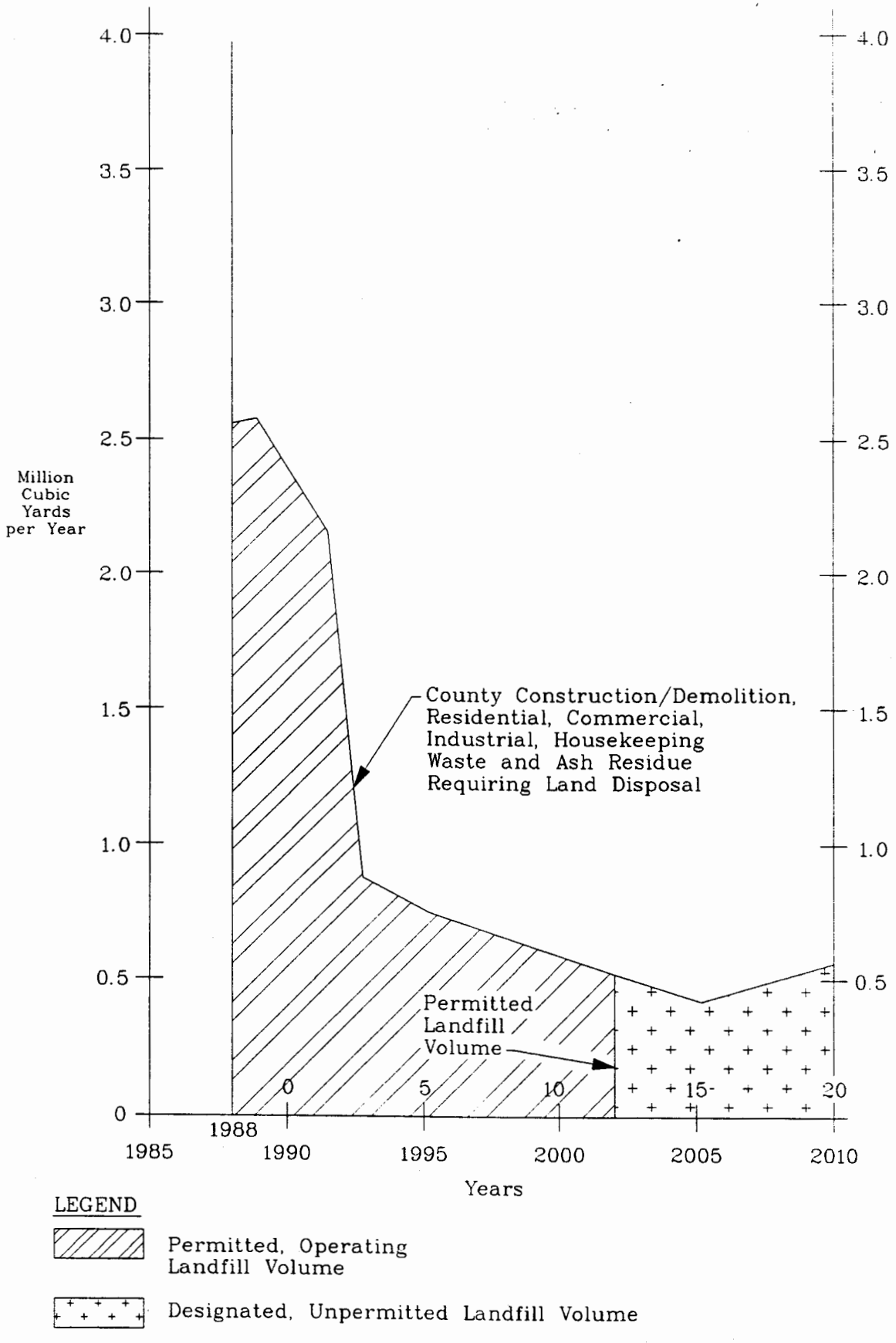
Note: This figure assumes that no waste reduction, reuse, recycling, composting, or waste-to-energy is implemented.

FIGURE 7.3-1
Landfill Requirements
NO-ACTION



Note: This figure assumes that there is an ongoing reduction in waste being landfilled from 1990 to 2010 until 80 percent of the waste stream is diverted from landfills.

FIGURE 7.3-2
Landfill Requirements Implementation of State Policy Goals



Note: This figure assumes 30% reduction through recycling by 1995; 50% reduction through recycling by 2005; 5% reduction by composting by 1995; 5% waste reuse/reduction by 1995; 10% waste reuse/reduction by 2005; 2600 tpd waste-to-energy in 1993 (actual capacity is 85% of these nameplate waste-to-energy capacities).

FIGURE 7.3-3
Landfill Requirements Implementation of County Policy Goals

8.0 DEVELOPMENT OF SELECTED SOLID WASTE MANAGEMENT ALTERNATIVE

The analysis of solid waste management alternatives (Section 7.0) concludes that a combination of disposal technologies would best serve Oakland County solid waste in the near-term (1990-1995) and long-term (1990-2010). The hierarchy of technologies proposed reflects the State's Solid Waste Policy, and therefore provides for the most beneficial consideration of public health, economics, environmental effects, energy use, and siting.

The Act 641 rules require that the County's Plan be selected based on seven factors. These factors and their evaluation are briefly discussed below:

- Technical feasibility: the proposed Plan incorporates technologies that are considered technically feasible now and in the future (at least for the 20-year planning period). Section 4 of this document discusses this in detail.

- Economic feasibility: the proposed Plan has been developed to integrate economically sound disposal technologies in an economically feasible manner. Section 8.8 of this document discusses system financing in detail - both in terms of capital investment and system operation and maintenance. Section 7 evaluates technology costs.

- Access to land: siting is a key element in solid waste planning. Solid waste facilities are historically difficult to site, regardless of the technology proposed. Siting decisions are made after taking into account available land in the County, the technical feasibility and costs associated with the proposed site and environmental and socio-economic impacts. During implementation of the system, the County

intends to make every effort to cooperate with local municipalities to site facilities while mitigating socio-economic and environmental impacts and yet working within the constraints of areas available. This strategy was successful in siting the County waste-to-energy and recycling facilities in Auburn Hills.

- Access to transportation networks: this factor is another siting issue which will be integrated into the selection process as facilities are developed.

- Effects on energy: Section 7 of this document discusses the proposed technologies' effect on energy use. Because waste-to-energy is included in the system, energy will actually be produced. Further, proposed reuse, reduction, recycling and composting programs will reduce energy demands to create new materials and/or products.

- Environmental impacts: the combination of technologies selected minimize adverse environmental impacts while managing the County's waste stream. Individually, each technology may be perceived as having some degree of negative impact; however, the County believes that it has selected the most environmentally sound combination of technologies.

- Public acceptability: the integrated system proposed by the County has been developed by incorporating input from a large cross-section of the public. As a result of this input, the County's system is acceptable to the majority of the public.

In the short-term, designated landfills will dispose of the majority of the County's waste as the County's recycling and composting programs and waste-to-energy facilities are implemented. The long-term waste disposal goals are to be met by 2005 and will rely on an integrated system of disposal technologies including waste reduction and reuse,

recycling, composting, household hazardous waste collection, minimal volume reduction through combustion with energy recovery, and minimal landfilling. The proposed system will be developed and operated in compliance with state laws and rules pertaining to the protection of public health and the environment and is based on a consideration of the available land in the County, the technical feasibility of disposal alternatives, and the economic costs associated with these alternatives.

The County has selected the best alternative system available. The advantages and disadvantages of each technology are discussed in Section 7. The evaluation of the proposed system considered advantages and disadvantages to public health, economics, environmental effects, energy use and siting. On balance, the County is convinced that the advantages of the proposed system far out weigh potential disadvantages.

In summary, the advantages of the Plan include:

- Public health/environment: realization of waste volume reduction goals will reduce the waste stream by 50 percent by 2005, minimizing landfilling and combustion, thus reducing the potential for groundwater contamination and air pollution.

- Economics: management of a County system will stabilize waste disposal costs in the future, as opposed to a system entirely dependent on private landfilling.

- Energy use: operation of a waste-to-energy facility will produce energy, while recycling, reuse, reduction and composting conserves energy and natural resources.

- Siting: a mechanism is in place for siting additional facilities in the event that existing or designated facilities are inadequate for the 20 year planning period.

The disadvantages include:

- Public health/environment: potential impact to groundwater, surface waters and the air if the facilities are not properly constructed, operated, and maintained. The County is proposing state-of-the art pollution controls to prevent these potential impacts.

- Economics: In the short-term, the cost to operate an integrated system may be greater than a system that depends entirely on private landfilling. Also, environmental liability may be incurred by the County if facilities are not properly constructed, operated and maintained. Further, some property owners in the vicinity of waste processing and disposal sites have expressed concern regarding the impact of these facilities on their property values. As mentioned previously, the County is proposing state-of-the-art pollution controls to reduce these last two concerns.

- Energy use: Waste hauling requires use of fossil fuels; however, the County plans to incorporate transfer stations where economically feasible to reduce use of fossil fuels to the extent possible.

- Siting: Local communities and residents are concerned about the impact of disposal facilities on roads, traffic patterns, public safety and environment. The County is working closely with local municipalities to address these concerns.

The County has developed management policies to guide the short-term and long-term disposal of solid waste. These policies are presented next, followed by detailed descriptions of the selected solid waste management plan. This Plan is considered complete and is intended to supersede and replace Oakland County's 1981 Plan.

It should be noted that the City of Northville, located in both Wayne and Oakland Counties, has requested to be included in Wayne County's solid waste planning efforts. Since this city is a member of the Wayne County Plan, it is not included in this Plan.

8.1 SOLID WASTE MANAGEMENT POLICIES

Implementation of the County's Plan will be guided by five policies that will ensure that the solid waste management needs of all communities are met in an environmentally safe and cost effective manner. The five policies are:

1. The County's solid waste management system must be consistent with the goal of maximum waste reduction, reuse, composting and recycling with minimum landfilling and combustion; therefore, all waste will be processed through a system reflecting the hierarchy of waste management techniques: reduction, reuse, composting, and recycling of separated recyclable materials (including construction and demolition debris) prior to volume reduction through combustion with energy recovery and landfilling.

2. Waste stream reduction including reuse/reduction, source-separation/recycling, and composting will be emphasized - specifically, no less than 30 percent of the waste stream by 1995 and 50 percent by 2005.

3. The County historically has not engaged in collection and hauling. Rather, it has left this aspect to the municipalities who in turn have mostly left it to private haulers. This pre-existing method of collection and hauling will not be altered, except that municipalities will require all haulers to collect source-separated recyclables from the residential, commercial, and industrial sources (or alternatively requiring that materials be separated at an

approved mixed-waste processing facility), in addition to other solid waste, and haul all collected waste to the County's designated facilities, whether County-owned or privately-owned. In the case of private haulers, the collection and hauling requirements will be conditions of their licenses and/or contracts.

4. The County will sponsor public education focusing on reuse/reduction (including purchase of recycled materials), recycling and composting for residential, commercial and industrial populations.

5. The County, as an implementor (in concert with the local municipalities and private industry), will provide administrative oversight and guidance to all communities regarding all system disposal methods.

Based on these policies, the County has developed a plan for effective and responsible future waste disposal for all participating communities.

8.2 SWPC - DESIGNATED FACILITIES

As the first step in implementing the Plan, the SWPC has redesignated a portion of the solid waste handling and disposal sites from the November 1981 Plan for inclusion in the selected system, subject to state permitting requirements and until such time as there is a factual basis for removal. The following existing and proposed facilities were designated in the November 1981 plan and are hereby designated in this Plan (refer to page IV-271 for the Solid Waste Planning Committee resolution No. 81-10-5, adopted October 26, 1981, which designated these facilities in the original Plan):

- SOCRRA Transfer Station
  Located at 991 Coolidge Highway near Fourteen Mile Road in Troy.

- Laidlaw Waste Systems Transfer Station
  Located at 21430 West Eight Mile Road in Southfield.

- General Motors Shred/Burn Processing Facility
  Located at the General Motors Truck and Bus Division facilities on South Boulevard and Opdyke in Pontiac.

- SOCRRA Incinerator (now proposed as a waste-to-energy facility). Located at 29470 John R near the intersection of Twelve Mile Road and John R in Madison Heights.

- City of Pontiac Collier Road Landfill (total site is approximately 220 acres; total disposal area is 90 acres, Type II facility) Located at 575 Collier Road, north of Collier Road in the City of Pontiac, occupying portions of Sections 4, 5, 8, and 9 of Pontiac Township. Bounded on the south by Collier Road, on the southeast by a parcel of vacant land and Joslyn Road, on the northeast by the SCA Landfill, on the north by Lake Angelus Road, and on the west by the Grand Trunk Western Railroad.

- Eagle Valley Landfill (28 acres, Type II facility)
  Twenty-eight permitted acres located at 600 West Silverbell Road in parts of Section 26 and 27 in Orion Township. Bounded by Silver Bell Road on the south, and Grand Trunk railroad on the southwest.[1]

- Lyon Land Development Company Landfill (total site is approximately 175 acres; disposal area is 60 acres, Type II facility). Located at 5380 North Milford Road in the northeast quadrant of Section 4 of Lyon Township. Bounded on the north by I-96 and on the south by Grand River Avenue.

1\ This site is currently the subject of litigation.

- o SOCRRA Landfill and proposed expansion (183 acres south of Avon Road, Type II facility plus 57 acres north of Avon Road for disposal of ash from SOCRRA's waste-to-energy facility). This expansion is included only as a covered ash monofill for waste-to-energy facility residue. Located at 741 Avon Road in Sections 13 and 24 of Avon Township within the limits of the City of Rochester Hills. Bounded on the south by School Road, on the east by Dequindre Road, on the north and northeast by a branch of the Grand Trunk Western Railroad, and on the northwest by a mobile home park.

- o Waterford Hills Landfill (50 acres, Type III facility) Located at 7900 Gale Road in the northwest corner of Section 7 in Waterford Township. Bounded on the south and west by the Pontiac Lake Recreation Area. Lies east of Maceday Lake Road. Note: this facility currently operates as a Type II facility under a court order.

- o Wayne Disposal -- Oakland Landfill and expansion (total site is approximately 93 acres; total disposal area is approximately 44 acres, Type II facility). Located at 2350 Brown Road in the northwest corner of Section 2 of Pontiac Township in Auburn Hills.

The Plan amendment sponsored by the SWPC in June of 1989, and approved by over 67 percent of the communities and the MDNR includes the following site which is hereby designated in this Plan:

- o County Waste-to-Energy Facility (approximately 20-30 acres) located in the City of Auburn Hills, south of Brown Road and West of Giddings Road (Northwest quarter, Section 3 Pontiac Township, Township 3 North, Range 10 East).

Also designated in this Plan are new sites or facilities that were not included in the November 1981 Plan, including:

- o SOCRRA material recovery facility located at 991 Coolidge Highway on the transfer station site.

- o Materials recovery facility (20,000 square foot building) located north of Rose Center Road and east of Pepper Road on what was formerly the Fisher property.

- o Eagle Valley Landfill expansion (total site equals 330 acres at 600 West Silverbell Road in Sections 26 and 27 of Orion Township, total disposal area equals 98 expansion acres plus 28 original acres - 126 acres Type II facility), including 98 acres adjacent to the north and east of the currently permitted area.

- o RRRASOC Recycling/Transfer Facility/Household Hazardous Waste Drop-off site. The specific site has yet to be identified. It will be located on one of the following sites:

  - Approximately 25 acres located on the west side of Wixom Road, approximately one-quarter mile south of Grand River Avenue, City of Novi.

  - Approximately 30 acres located on the west side of Haggerty Road, approximately one-quarter mile north of Grand River Avenue, City of Novi.

The final site as selected by RRRASOC will be included in the final Plan Update. Upon final selection by RRASOC, the remaining site will be eliminated from the Plan.

- o The County material recovery facility located on approximately 10 acres immediately adjacent to the proposed County waste-to-energy facility site in Auburn Hills, north of Lake Angeles Road and the west of Giddings Road.

- Pontiac material recovery facility. Located in Highwood Industrial Park, directly south of the City's landfill and bounded on the north by Collier Road and on the west by the Highwood Extension. The facility will accept material from within and outside Pontiac.

- Any other solid waste processing or disposal facilities that are approved in accordance with the procedures set forth in Section 8.5 of this Plan.

The following facilities are planned in the County, but as yet have not been sited:

- County composting facility(ies)
- County transfer station(s)
- County landfill site(s)
- Clarkston Disposal Recycling/Transfer Facility (Springfield Township Area).

Section 3.3 contains detailed descriptions of existing operations at the GM and SOCRRA facilities and at the first six landfills listed.

Note that facilities in the County that require Act 641 construction permits at the time of issuance of this Plan and that are not explicitly listed above are specifically excluded from this Plan.

The following sections discuss the role of these facilities within the County's solid waste management system and introduce additional components that complete the system.

8.3 SOLID WASTE MANAGEMENT PLAN IMPLEMENTATION

The County's Plan focuses on four solid waste disposal technologies, with a major emphasis on recycling and composting. The Plan also includes a community involvement process through the inclusion of reuse and reduction programs. The entire County system is based upon certain municipal commitments to the County regarding the waste stream, as described in Section 8.7. Upon receipt of such commitments, the County is obligated to dispose of the municipalities' solid waste. The technologies include:

- Reuse/Reduction: including public education, coordination with local efforts and possible sponsorship or support of such programs as reuse centers or waste assessments for private businesses.

- Recycling: including up to two County-owned 400 ton per day (five days per week) materials processing facilities and possibly one combined recycling facility and transfer station owned by the RRRASOC (580 tpd five days per week), and one owned by SOCRRA (400 tpd; 5 day/wk). The potential exists for additional participation by an unlimited number of other governmental units and/or privately-owned facilities. This means the County is accepting the responsibility for a minimum of 20 percent of the recycling County goal. Should non-County recyclers fail to capture the other 80 percent, the County will take up the balance, to the extent practicable.

- Composting: including County-owned facilities with initial design capacity of 550 tons per day on an actual basis during the eight month growing season, operating six days per week. On a twelve month basis this represents a capacity of approximately 110,000 tons per year (note that this is a design capacity; throughput would be approximately 5 percent

of the waste stream). Additionally, the potential exists for participation by an unlimited number of other governmental units and/or privately - owned facilities.

- Volume Reduction through Combustion with Energy Recovery: initially including one County-owned facility with a nameplate capacity of 2,000 tons per day and one SOCRRA facility with a nameplate capacity of 600 tons per day. The actual processing or throughput capacity of waste-to-energy facilities is generally accepted to be 85 percent of the nameplate capacity. The final configuration depends upon (1) whether SOCRRA requests the County to proceed in lieu of rehabilitating its 600 tons per day incinerator and (2) the efficiency of the integrated system on an operating basis.

- Landfilling: In the short-term (not to exceed 10 years), the County will contract with private and public landfills to provide capacity to meet system bonding requirements for system funding. In the long-term (10 to 20 years), County-owned sites will supplement contracted capacity to meet the overall goal of 20 years of capacity for the Plan. The integrated solid waste management system discussed in this Plan provides for a comprehensive waste disposal solution, including addressing the pending exhaustion of the existing landfill capacity, as the facts are currently known. A timeframe for implementation of long-term County landfill facilities is an estimate because the rate at which the contracted capacity will be used will depend on the ability of system municipalities to meet volume reduction goals presented herein. In that regard, within five years of the integrated system becoming operational, the efficiency of all system components will be reassessed to guarantee the continued viability of the waste management solution. As the need for more capacity is indicated, new facilities will be sited in accordance with the provisions of Section 8.5.

For all County-owned facilities except composting, the County will procure construction and operation services through the competitive negotiation process.

Additionally, the County will provide public education to residential, commercial and industrial sectors to promote reuse and reduction; it will cooperate and coordinate with local, state and federal efforts in waste reduction and reuse to the extent feasible. Currently, the County is considering sponsorship of reuse/reduction programs such as reuse centers, waste exchanges and information networks, corporate recognition programs for businesses which reduce packaging, and waste assessments to be provided upon request to business entities and municipalities.

The following sections describe the implementation schedule and activities for each of the four disposal technologies: recycling, composting, volume reduction through combustion with energy recovery and landfilling.

8.3.1 RECYCLING

There is no limit on the number of municipal and/or privately-owned and operated facilities since there will be more waste available for recycling than will be processed by the County. Participating communities will be required to pass ordinances requiring source separation (or alternatively requiring that materials be separated at an approved mixed-waste processing facility) and provide for collection of these materials but will have the option of directing their recyclables either to a County-owned facility or to a non-County-owned facility. For example, the RRRASOC may operate a combined recycling facility/transfer station to serve its members. A private vendor will operate any County-owned facility pursuant to a contract, and such facility will have the ability to process source separated and/or mixed recyclables.

Should the non-County-owned facilities falter either technically or economically, the County will be capable of accommodating the processing of additional waste through either the expansion of shifts and/or adding equipment and/or staff. This system is intended to allow the County to continue to meet its recycling goals regardless of future circumstances.

Reiterating, the system facilities will guarantee that the County has at least 800 tons per day recycling capacities (through increase of processing equipment and/or staff) plus additional capacity provided by non-County-owned facilities. Moreover, system flexibility insures changes in facts can be accommodated without undermining the attainment of the overall goal. Finally, the County will provide administrative oversight, technical assistance and system-wide public education.

The County is planning to recycle at its facilities among other things:

- Newspaper
- Office Paper
- Computer Paper
- Corrugated Paper
- Ferrous Metal Containers
- Aluminum Containers
- Glass Containers
- Plastic Containers

A private contractor has been secured to design, construct, and operate the County-owned facility. The amounts recycled, the recovery rates and the quality of the recycled materials at each plant may vary. The estimated schedule for implementation of the first County material processing facility is:

Issue Request for Qualifications	August 1989
Receive Bids from Qualified Contractors	March 1990
Issue Notice to Proceed to Contractor to Begin Construction at First Facility	Fall 1990
Begin Operation of Facilities	Summer 1992

This facility will be located west of Giddings Road and north of Lake Angelus Road in Auburn Hills, adjacent to the proposed waste-to-energy facility.

The County's operator will market the recovered materials as the County's agent. Additionally, the operator will be required to cooperate with non-County recyclers for efficient marketing of all the recovered materials obtained. Appendix C contains the technical specifications that the private contractors were required to meet in the bidding process. Contractors will select equipment to meet these specifications, which have been developed to assure that the County attains its established recycling goals.

Should any recovered materials not be marketable at the County material recovery facilities due to fluctuations in the market price, these materials may be stock-piled at a designated storage area until the market recovers. None of these materials will be combusted or landfilled without guidance from the Executive Committee of the Solid Waste Board concerning all alternative environmentally safe handling procedures (refer to Section 8.7 for further discussion of Solid Waste Board).

The County will encourage the recycling of demolition debris to the extent practicable to ensure the maximum amount of reuse of such material and to extend the life of landfills.

8.3.2 COMPOSTING

The County plans to purchase or lease (long-term) land for a system of composting sites. The composting operation will handle yard waste, wood waste, and lake weeds and be capable of receiving approximately 500 tons per day on an actual basis during the eight months growing season, operating six days per week.[3] Operations are expected to begin in 1990. County staff may operate or contract the operation of the composting operation. The composting facilities will be available to all County residents and merchants. If there is more material available for composting than the approximately 550 tons per day, additional sites will be developed.

The compost product will be used by the County for grounds maintenance; and the remainder will be made available to County residents, businesses and farmers.

Additional composting sites will be developed and operated by individual communities, Pontiac, RRRASOC, SOCRRA and other public and private operations.

8.3.3 VOLUME REDUCTION THROUGH COMBUSTION WITH ENERGY RECOVERY

By 1993, the County plans to have up to two waste-to-energy facilities operating. One is the plant to be built for the County by Westinghouse, which will be 2000 tons per day[4] nameplate capacity.

3/ This capacity is equivalent to approximately 110,000 tons per year.

4/ 2000 tons per day is the nameplate capacity assuming a Btu value of 5200 Btus per pound; the actual amount processed or the "throughput capacity" is 85 percent or 1700 tons per day. The waste processed through a waste-to-energy facility will not include materials such as batteries and tires that could generate toxic emissions or ash.

The other is a rehabilitated incinerator owned by SOCRRA; or if SOCRRA requests, another County facility. Factors indicating the need for additional capacity are: (1) number of tons committed by municipalities; (2) quantity of residue from the recycling centers; (3) seasonal variations in the volume of the waste stream; and (4) economics.

However, it was decided that the effectiveness of the integrated system be reviewed during a five year evaluation period subsequent to the system becoming operational, and include an analysis of the need, if any, for an additional waste-to-energy facility.

The County can provide a Notice to Proceed (an order to Westinghouse to begin construction of the waste-to-energy facility) only when certain conditions have been met. The most important conditions precedent to be satisfied are:

- Siting.
- State legislation, financing.
- Execution of a power sales contract and approval by the Public Service Commission.
- Receipt of all requisite environmental permits.
- Contractual commitment by participating municipalities for delivery of waste.

It is believed that Westinghouse will be given such a Notice by Fall 1990, and the facility will commence operating in Summer 1993.

It should be noted that the County will have an obligation with the contractor to pay a service fee even if it is unable to deliver the agreed upon specified tonnage of waste. The municipalities will not be obligated to deliver a specific number of tons; instead, they will agree to cause to be delivered to the appropriate County-designated facility all of the noncompostable and nonrecyclable solid waste generated within its boundaries.

Local municipalities will control the flow of waste through hauler licensing. By agreement with the municipalities, the County will enforce flow control with municipalities processing licensing revocations. All communities contracting for the waste-to-energy facility must also participate in the County's recycling and composting programs. The County recycling program will include participation by non-County-owned recycling facilities. Thus, the communities will have the choice of delivery to a County-owned or non-County-owned facility.

The SOCRRA incinerator, located in Madison Heights, ceased operations in July 1988. SOCRRA currently is planning to rehabilitate the 600 ton per day facility, including energy recovery capability, reopen the facility, and incinerate most of the residential solid waste from the district. SOCRRA has only disposed of residential and some commercial waste in the past.

If SOCRRA chooses not to rehabilitate, the County will undertake the development of another waste-to-energy facility.

The County has the responsibility for hauling and disposal of the ash residue from its waste-to-energy facility. This ash will be disposed of in a specially designed monofill, designed to hazardous waste standards (Act 64). Such disposal will meet or exceed current Federal and State requirements for ash disposal.

8.3.4 HOUSEHOLD HAZARDOUS WASTE COLLECTION

Due to the toxic nature of certain household products (batteries, cleaning fluids, cleansing agents, and bleaches etc.), special disposal techniques are required. As a result, the residue, from these products should not be placed in landfills due to the problem of the leaching of toxins by rainwater. Similarly, a waste-to-energy facility should not incinerate batteries and other hazardous material that could have a negative impact on the ash or stack emissions.

The County is contemplating the drop off (collection) of such wastes on a periodic as needed basis, viz, once every other month or once every six months. The County is planning to initially engage in the procurement process to contract for the set up of a mobile temporary collection center at County designated sites throughout the County and disposal by a licensed hauler on a per-day basis.

The licensed hauler will be required to dispose of the collected household hazardous waste at proper disposal sites. The County will employ a manifest system to document waste disposal and the handling procedures followed from the point of collection to the point of disposal.

If the amount of these materials is significant, the County will consider siting a permanent collection and storage facility. The permanent collection site could operate independent of or in conjunction with the mobile temporary collection center. The permanent collection/storage site would have to have secondary containment capacity for the stored waste as well as comply with all applicable requirements of the Fire Marshal.

8.3.5 DISPOSAL OF USED TIRES

Tires must be handled appropriately to avoid environmental problems. The County will cooperate with the State to develop a separate program to dispose of used tires. The County should take affirmative action to discourage above ground storage or land disposal of whole tires, by requiring the use of shredding, splitting, pulverizing, cryogenic treatment or other methods to improve the recycling and marketability of used tires. The County should thoroughly enforce existing legislation regarding the nuisance of fire hazard of above ground storage of whole tires.

8.3.6 LANDFILLING

The County will be responsible for providing through contract or direct ownership, environmentally safe landfill(s) to accept residue generated by the County's facilities, including waste-to-energy ash, nonprocessible waste, or recycling and compost residue and bypass. In the short-term (not to exceed 10 years), the County will contract with private and public landfills to meet system bonding requirements. Additional County-owned landfills will be added to the system to supplement initial facilities (not to exceed 20 years of capacity) and will be sited in accordance with the interim siting procedures of Section 8.5.

Currently, the County is negotiating with public and private landfills to develop contracts for short-term capacity needs. A timeframe for implementation of long-term County landfill facilities (10 to 20 years) is an estimate because the rate at which the contracted capacity will be used will depend on the ability of the system municipalities to meet the volume reduction goals set herein.

Users of the County-provided landfill(s) must meet criteria established by the County. Additionally, any privately-owned landfill operations within the County that requests designation in any future update of the Plan must agree to meet criteria established by the County. All landfills operating in the County must maintain records describing where accepted waste was generated.

Since this Plan is intended to guide the appropriate management of the County's waste for a 20-year period, in accordance with Act 641 as amended, waste generated in out-of-County systems that would negatively impact the goals of Oakland County's Plan will not be approved for disposal within the County.

8.4 RESULTS OF SOLID WASTE MANAGEMENT IMPLEMENTATION PLAN

The implementation goal is to have all of the facilities operating in tandem by the end of 1993.[5] They are to be constructed to treat the County's solid waste as required by statute. It is hoped that increased recycling will preclude the need for additional waste-to-energy capacity. However, if the County's policy of minimal landfilling and combustion and the 30 to 50 percent combined reduction/reuse, composting and recycling goals are not being attained, an additional waste-to-energy facility or other volume reduction processing/disposal facilities may have to be implemented.

8.5 CRITERIA AND PROCEDURE FOR DESIGNATING AND SITING ADDITIONAL SOLID WASTE DISPOSAL FACILITIES

The following process has been developed to provide a method for designating and siting new solid waste disposal facilities and expansions to existing facilities in the interim period between Plan updates. This process will allow for a uniform evaluation of alternative proposals, thereby guaranteeing that the most viable options are selected for more careful scrutiny by the MDNR under Act 641. All solid waste facilities subject to Act 641 construction permit and license requirements must comply with this designation and siting process. The interim criteria for landfills shall include the parameters and acceptability guidelines listed herein.

No Municipality which has an operating, designated landfill or landfills, as described in this Plan, will be considered as the recipient of an additional landfill site during the life of the Plan, notwithstanding legal action which may force the County to impose an additional site onto a Municipality as the result of a court directive,

5\ Refer to Table 8.3-1 at the end of this section for a summary of where waste will be disposed of as the County meets its disposal goals through the components of the County's system.

provided other qualified sites are available in other Municipalities in the County. Sanitary landfills may not be expanded beyond those descriptions or acreage as designated in the Plan for the life of the Plan unless the Municipality by action of its governing body specifically authorizes the expansion or expansions and the Plan is amended accordingly. Any Municipality having one or more designated sanitary landfill sites in the Plan may opt for additional sanitary landfill sites at any time in the future upon concurrence of its governing body and amendment of the Plan.

Some facilities such as composting sites and recycling drop-off centers are not regulated by Act 641 because they only accept source-separated materials. The County intends to leave the siting of these facilities to the discretion of local communities. Therefore, those facilities not subject to Act 641 construction permit and license requirements are not required to comply with this process.

8.5.1 COUNTY REVIEW COMMITTEE

A County Review Committee ("CRC") will be formed to participate in this process. The chairperson of the SWPC will be the chairperson of the CRC. The voting membership of the CRC will be composed of the members of the SWPC. The CRC will also have a minimum of five non-voting members: one representative each from the County's proposed Department of Solid Waste Management, Health Department, Planning Division and Road Commission; and the chief elected official(s) or appointee(s) from (i) the host community and (ii) any other adjacent or any other affected community(ies). Affected or adjacent communities are those located within the County or contiguous county anticipating significant impacts from the proposed facility site, including the host community. The affected/adjacent community representative(s) will be selected by the County Executive. If more than one affected/adjacent community is involved, the County Executive may appoint one representative from each.

The Oakland County Department of Solid Waste (OCDSW) will be responsible for several review and analysis assignments in support of the CRC including distributing materials relating to CRC activities and making appropriate arrangements for meetings and other functions as described below.

The purpose of the CRC is to conduct a preliminary evaluation of proposed solid waste facilities sites, giving consideration to local socioeconomic and environmental concerns. The CRC is not charged with conducting a comprehensive technical analysis of proposed sites, nor is the process described in this section intended as a substitute for the detailed review and analysis conducted by the MDNR under Act 641. The MDNR is charged with protecting public health and the environment and regulating the management of solid wastes under Act 641. The MDNR has the ultimate authority to determine the overall environmental soundness of the proposed facility on the proposed site in accordance with the rules and regulations that have been established. The CRC is responsible for considering the views, concerns, land use planning goals and policies of the County and the individual communities in determining basic site acceptability for a proposed waste management activity. The site acceptability will be determined based upon its consistency with Act 641, the goals and objectives of the Plan and the six evaluation parameters and corresponding acceptability guidelines described in Section 8.5.10.

The specific steps involved with the siting process are illustrated in Figure 8.5-1 (located at the end of Section 8) and are discussed in detail below.

8.5.2 HEALTH DEPARTMENT ADVISORY ANALYSIS

The applicant shall request an advisory analysis on a new facility or an expansion of an existing facility from the Oakland County Department of Health, as mandated in Act 641. The request should consist of a letter accompanied by a description of the proposed project and site. A USGS

map or its equivalent should also be provided with the site clearly labeled. Three copies of this package must be provided. Upon receipt of the request, the Department of Health will notify the OCDSW and the affected and adjacent community(ies). The Department of Health also will publish a notice in a newspaper having major circulation in the vicinity of the proposed project. Within 15 days of the initial request for an advisory analysis, the Department of Health will respond in writing to the applicant, giving its analysis, and will supply the applicant with the County's Solid Waste Management Plan.

8.5.3 APPLICATION FOR SOLID WASTE MANAGEMENT PLAN DESIGNATION

The applicant shall apply for solid waste management plan designation and submit a review fee and a minimum of 25 copies of a preliminary environmental assessment to the CRC for a determination of completeness. The preliminary environmental assessment must address the six evaluation parameters required by the CRC in considering the proposed site and facility (see Section 8.5.10). The purpose of the preliminary environmental assessment is to present and evaluate the proposal in the context of suitability of the site. Detailed design information and a detailed hydrogeologic study typically prepared for MDNR evaluation are not required. The applicant should review the CRC evaluation parameters under the subsection "CRC Evaluation" (Section 8.5.10) and provide the requested level of detail with appropriate documentation for each parameter. Sources of data/information must be referenced.

A review fee will be collected by the OCDSW from the applicant to pay expenses incurred by the County for the review process.

The review fee schedule is as follows:

- Landfills and combustion facilities $10,000
- MRFs transfer stations and compost facilities $5,000

Upon completion or termination of the process, any unexpended funds will be returned to the applicant. The fee will be used to reimburse the County for expenses such as:

- Conduct required public hearings and related services
- Publication of notices and printing documents
- Consultant fees for specialized services, as determined necessary by the CRC.

The fee indicated above will not be exceed unless the CRC determines that an additional fee amount is warranted because of multiple submittals of various documents.

8.5.4 COMPLETENESS REVIEW

Upon receipt of the preliminary environmental assessment and review fee, the OCDSW and CRC Chairperson will review the document to determine if sufficient information is provided for CRC evaluation. Within 30 calendar days, the applicant will be notified in writing of any deficiencies found in the preliminary environmental assessment.

The OCDSW also will notify the affected and adjacent communities and owners of property contiguous with the proposed site upon receipt of the preliminary environmental assessment and other submittals. Once affected and adjacent community(ies) are notified of the proposal by the County, they must recommend representatives to serve on the CRC to the County Executive within 30 calendar days and identify the anticipated impacts of the proposed facility upon their area of jurisdiction. After consultation with the OCDSW and the CRC Chairperson, the County Executive will appoint representatives from the affected and adjacent community(ies), with the consent of the Board.

8.5.5 SOLID WASTE PLANNING COMMITTEE MEETING

A needs analysis will be completed upon submittal of the above information to consider County-wide needs over a five year period from the date of application. If need cannot be adequately demonstrated to the CRC, the application will not be considered further.

Following the completeness review and receipt of any changes arising therefrom, the SWPC will meet to:

- Form the CRC and formally accept the application for review;
- Receive a general briefing from the OCDSW concerning the contents of the application;
- Recognize the non-voting CRC members from the County agencies, the host community and the affected and adjacent communities; and
- Set the date of a public hearing to hear a presentation on the project by the applicant and to receive public comment.

8.5.6 CRC PUBLIC HEARING

Information submitted by the applicant will be available for public review. Unless notified by the affected community(ies) that a detailed independent review of the submittal will be conducted, a notice of public hearing will be published in a newspaper circulating in the County and mailed to the clerk of each municipality in the County upon receipt of the preliminary environmental assessment and completion of the completeness review, and a public hearing will take place not more than 45 calendar days after the notice is issued. If the affected community(ies) notify the County that an independent review of the preliminary environmental assessment will be conducted, the notice of a public hearing will not be issued for at least 60 calendar days after

receipt of the preliminary environmental assessment, and the public hearing will be held not more than 30 calendar days after the notice is issued.

Public record will remain open for 10 calendar days following the public hearing to provide an opportunity for written comments. The CRC will adjourn for a maximum of 30 calendar days after the public hearing to consider information obtained through public comment.

8.5.7 FIRST CRC MEETING

Within 30 calendar days of the public hearing, a CRC meeting is held to review the preliminary environmental assessment and other applicant submissions, the County's comments and the comments made at the public hearing. Such meeting will be open to the public. Following the CRC meeting, the applicant may decide to continue with the original proposal, or revise the proposal, in which case the process will begin again.

8.5.8 REVISED PRELIMINARY ENVIRONMENTAL ASSESSMENT/ APPLICANT SUBMISSIONS

Within 30 calendar days following the first CRC meeting, the applicant is required to submit not less than 25 copies of a revised preliminary environmental assessment and any other documentation that addresses comments from the CRC, the public hearing, and the County.

The preliminary environmental assessment and any other documents must contain sufficient information to enable the CRC to perform a complete evaluation. This evaluation will be based on County and local environmental, socioeconomic, and land use planning concerns.

8.5.9 NOTICE OF PROJECT CHANGE

If the proposed project changes at any point following the initial request for advisory analysis, and prior to County Board approval, the applicant must provide written notice to the Oakland County Department of Health and the CRC of the change(s). The Department of Health and CRC will review the information and, depending upon the significance of the change, may notify the affected and adjacent community(ies) and publish notice of the change in the local newspaper. The CRC, with recommendations from the OCDSW and Department of Health, will decide whether the proposed change warrants submittal of a revised preliminary environmental assessment and/or resubmittal of any other information previously provided. The CRC will notify the applicant in writing of the significance of the proposed change and will indicate the necessary steps to incorporate the change into the review process.

8.5.10 CRC EVALUATION

The CRC will reconvene at least one time within 45 calendar days of submittal of the revised application (or 45 days of the public hearing if no revised application is submitted) to evaluate all available data and to recommend approval of the proposal to the County Executive or to disapprove the application. This recommendation will be based on the CRC evaluation of the application and information received during the public hearing. The procedure followed for SWPC meetings also will be followed for CRC meetings.

Act 641, of the Public Acts of Michigan of 1978, as amended, requires the designation in the Solid Waste Plan of many components of proposed solid waste handling and facilities, such as transfer stations, materials recovery facilities (only if processing mixed waste), incinerators (waste-to-energy) and landfills. Those proposing to provide such solid waste processing and/or facilities shall prepare an application for designation which responds to the questions listed for each of the following six parameters. Part (a) of each parameter

contains the specific request for information required for designation. Part (b) of each parameter describes the evaluation guidelines for proposed facility sites. The substance of the designation analysis controls over the specific format. Several of the evaluation guidelines are not applicable to all types of facilities. In such cases, the applicant for designation should state why the guideline does not apply to its proposed facility.

The applicant must establish the need for an additional facility within the County. If the CRC determines that there is no need, then the application will be denied. The need will be based on system configuration, capacity and the public interest. The applicant may request CRC concurrence with facility need prior to providing any additional data requested. The CRC would respond to the request for concurrence with need prior to the submittal of the completed application.

The CRC will evaluate all the applicants' responses and data submitted and will make a designation decision based upon the balance of interest and requirements, as reflected by the following six parameters:

1. EVIDENCE OF COMPLIANCE WITH PLAN GOALS, OBJECTIVES AND POLICIES

   A. Evaluation Parameter

   - How will the project comply with the specific goals, objectives, and policies specified in the Plan?

   B. Acceptability Guidelines

   - The project must be in compliance with the specific goals, objectives and policies specified in the Plan. Additionally, there must be a need for the proposed facility.

2. INTERACTION WITH ONSITE AND ADJACENT LAND USES AND LAND USE PLANS

A. Evaluation Parameter

- Identify all existing or proposed residential areas that lie within 1/2 mile of the site.

- Identify all sensitive receptors (schools, day care centers, churches, residences, historic areas, hospitals, nursing homes) that are located with 1/2 mile of the site.

- Identify all recreational facilities that are located within 1/2 mile of the site.

- If any of the above are present, describe the plan for buffering by vegetation or topography.

- What is the interaction of the project with existing and future land uses of the site and nearby areas?

- What is the zoning of the site and what are the permitted uses according to local ordinances?

- Identify any potential conflicts with site use (i.e., any other proposals for the site).

- Identify any airports within 10,000 feet of the site. For landfill siting proposals, evidence of contact with the Michigan Aeronautics Commission must be provided, regardless of the site proximity to the airport(s).

B. Acceptability Guidelines

- o Minimize land use conflicts; consider adjacent land uses of industrial character more compatible than sensitive or commercial land uses.
- o Minimize number of residences to be relocated.
- o Minimize impacts of facility on sensitive land uses (schools, day care centers, churches, residences, nursing homes, hospitals, and historic areas).
- o Avoid siting a facility in a publicly-owned recreation area purchased by land and water conservation fund and/or urban park and recreation recovery program.
- o Maximize the amount of buffer, especially wooded buffer, surrounding the site area.
- o Maximize the amount of coniferous vegetation in the wooded buffer.
- o Locate in an area currently identified for future compatible land use activities, with industrial considered more compatible than sensitive or commercial land uses.
- o Minimize impact of facility on airport operations.

3. POTENTIAL IMPACTS TO ENVIRONMENTAL RESOURCES

A. Evaluation Parameters

- o What is the approach to protect or enhance environmental resources?

- To what degree and in what ways will the project affect fisheries, wildlife, or vegetation (including wetlands), especially any federal or state-listed rare or endangered species? Evidence of contact with MDNR Wildlife Division, Fisheries Division, and Land Resource Programs Division must be provided.

- Describe any development that will be in a 100-year floodplain or floodway.

- Identify all surface water bodies, wetlands or floodplains lie within 1,000 feet of the site.

- To what degree and in what way will the project alter surface water bodies or impact drainage patterns?

- Identify the introduction of any pollutants, including sediments, into surface waters or groundwater. What control measures are planned?

- Describe increases in peak discharge rates for stormwater drainage resulting from the project. What control measures are planned?

- Identify any prime farmland (as defined by the Soil Conservation Service) on the site.

- How does the aquifer underlying the site affect present and projected water supplies?

- Identify any surface waterbody used as a drinking water supply in the watershed containing the project.

- o Identify any public or private drinking water wells within a 1/2 mile radius of the proposed project. If some exist, are the wells upgradient or downgradient of the proposed site?

- o Describe the project's consumption of water. How much?

- o Describe the project related generation, use, transportation, storage, release or disposal of hazardous materials. What facility processes are involved?

- o Identify portions of the site previously used for the generation, transportation, storage, release or disposal of hazardous materials.

- o Identify the soil characteristics on the site.

- o What sources of air contamination are associated with the project and what quantities of contaminants will be released? What is the expected impact to ambient air quality?

- o Describe project-related generation of odors, noise, vectors, rodents, or litter. What control measures are proposed?

B. Acceptability Guidelines

- o Avoid siting facility in natural areas of county-wide significance, i.e., tracts of land containing relatively undisturbed native vegetation, land resembling that which existed prior to European settlement, or sites which reflect the County's natural diversity.

- o Minimize wetland disruption and replace aggregate disturbed wetlands on at least a one to one basis.

- o Avoid disturbance to habitats supporting threatened and endangered species.

- o Minimize the impact to 100-year floodway/floodplain areas and minimize impact of the facility on surface waters during flood periods and impact of flood on facility.

- o Minimize disturbance to intermittent streams that drain less than two square miles.

- o Minimize impact to potentially sensitive county drains, county streams and natural drainage areas.

- o Minimize impacts from erosion and sedimentation.

- o Protect existing surface and groundwater resources from release of pollutants: aquifer potential, local geology and recharge areas. (Aquifer potential describes the likelihood of encountering a significant water-bearing zone in the first 50 feet of sediments which, if contaminated, would diminish available water supplies in the area).

4. POTENTIAL SOCIOECONOMIC IMPACTS

A. Evaluation Parameters

- o What is the approach to protect or enhance socioeconomic conditions?

- o Identify the population density in the project area.

- o In what ways and to what degree will the project impact on nearby community services (police, fire, hospital)?

- o What contingency plans have been proposed for emergencies? What has been the reaction to this plan by the local police and fire departments? Evidence of contact must be provided for each.

- o What economic impact will the project have on the affected community(ies) (jobs created, real estate values)?

B. Acceptability Guidelines

- o Minimize the reduction of the host municipality's tax base because of project development.

- o Consider the concerns of municipalities hosting a facility within their borders and consider the concerns of other municipalities which believe they are impacted.

- o Minimize the relocation of business.

5. POTENTIAL IMPACT TO CULTURAL RESOURCES

A. Evaluation Parameters

- o Identify the approach to protect or enhance cultural resources.

- o Describe any site or structure of historic significance that may be affected by the project. (Evidence of contact with State Historic Preservation Office must be provided).

- o Describe any archaeological site that may be affected by the project. (Evidence of contact with State Historic Preservation Office must be provided).

- o Describe any apparent conflict with existing adjacent structures in terms of size, physical proportion and scale, or significant difference in land use.

- o Describe any project impairment of visual access to waterfront or other scenic areas.

- o Identify existing visual buffering opportunities are available (topography, vegetation) or proposed as part of the project.

B. Acceptability Guidelines

- o Avoid impacting cultural resources.

6. ACCESSIBILITY

A. Evaluation Parameters

- o Identify the primary access route or routes to the site and what are the land uses adjacent to that route or routes.

- o Describe any roadway improvements necessary. What improvements are proposed?

- o Identify the existing traffic patterns and counts. What is the anticipated increase in traffic during construction and operation (number and type of vehicles).

application materials will be returned to the applicant. It is unlikely that a proposed site will comply with each and every criteria established in the Plan, and the evaluation and recommendation by the CRC will by necessity weigh the compliance and noncompliance factors against each other and against the overall consistency with the goals and objectives of the Plan. In recommending approval of an application to the County Executive, or in denying an application, the CRC shall act by a majority of its voting members.

8.5.11 COUNTY EXECUTIVE ACTION

Upon receipt of a recommendation from the CRC to include an application for a proposed site in the County's Plan, the County Executive will review the record. If, based upon the County Executive's review of the record, in light of all of the criteria, the County Executive recommends the site for inclusion, the County Executive will forward the recommendation to the County Board for approval. If a proposed site is determined not to be consistent with the goals and objectives of the Plan, the County Executive will return the application materials to the CRC along with a written explanation of the reasons for the rejection of the proposed site, and the CRC will return the application materials to the applicant. In reviewing the record and a recommendation by the CRC to include a proposed site in the Plan, the County Executive will give due regard to the recommendation of the CRC, and will reject a recommendation only if there is clear and convincing evidence that a proposed site does not meet the goals and objectives of the Plan.

8.5.12 COUNTY BOARD ACTION

Upon receipt of a recommendation from the County Executive to include an application for a proposed site in the County Plan, the County Board will review the record. If, based upon review of the record, in light of all criteria, the Board finds the proposed site consistent with the goals and objectives of the Plan, the proposed site will be included in the Plan. If a proposed site is determined not to be consistent with

B. Acceptability Guidelines

- o Minimize the exposure (ability to hear, see, smell or feel vibration of trucks) of residents located along access routes to the site.

- o Avoid routing of hauling trucks through commercial centers.

- o Minimize the impacts of facility truck traffic on the existing road system capacity.

The CRC will evaluate an application for a proposed site in light of each of the general and detailed criteria set forth in the Plan. As compensation for the various impacts associated with a solid waste facility, this plan endorses the concept of payment, by the facility owner, to the community in which the facility is located, of a "host community fee." The two parties involved (the facility owner and the community within which the facility is located) shall have the responsibility of negotiating a mutually acceptable host community fee. For new or expanded facilities, the existence of a mutually agreed-upon host community fee, or the lack thereof, may be taken into account in the evaluation, recommendation, and decision to include or deny inclusion of the proposed facility in this Plan.

Following the public hearing, the CRC will issue a written report detailing its evaluation, containing findings regarding a proposed site's compliance or noncompliance with each and every criteria. If an application for a proposed site, based upon a review of all the criteria, is found to be consistent with the goals and objectives of the Plan, it will be forwarded to the County Executive with a written recommendation for inclusion in the Plan. If, based on the foregoing review, a proposed site is found not to be consistent with the goals and objectives of the Plan, the application will be denied and the

application materials will be returned to the applicant. It is unlikely that a proposed site will comply with each and every criteria established in the Plan, and the evaluation and recommendation by the CRC will by necessity weigh the compliance and noncompliance factors against each other and against the overall consistency with the goals and objectives of the Plan. In recommending approval of an application to the County Executive, or in denying an application, the CRC shall act by a majority of its voting members.

8.5.11 COUNTY EXECUTIVE ACTION

Upon receipt of a recommendation from the CRC to include an application for a proposed site in the County's Plan, the County Executive will review the record. If, based upon the County Executive's review of the record, in light of all of the criteria, the County Executive recommends the site for inclusion, the County Executive will forward the recommendation to the County Board for approval. If a proposed site is determined not to be consistent with the goals and objectives of the Plan, the County Executive will return the application materials to the CRC along with a written explanation of the reasons for the rejection of the proposed site, and the CRC will return the application materials to the applicant. In reviewing the record and a recommendation by the CRC to include a proposed site in the Plan, the County Executive will give due regard to the recommendation of the CRC, and will reject a recommendation only if there is clear and convincing evidence that a proposed site does not meet the goals and objectives of the Plan.

8.5.12 COUNTY BOARD ACTION

Upon receipt of a recommendation from the County Executive to include an application for a proposed site in the County Plan, the County Board will review the record. If, based upon review of the record, in light of all criteria, the Board finds the proposed site consistent with the goals and objectives of the Plan, the proposed site will be included in the Plan. If a proposed site is determined not to be consistent with

the goals and objectives of the Plan, the Board will return the application materials to the CRC, along with a written explanation of why the site was denied. The Board will give due regard to the CRC and County Executive recommendations in evaluating the proposal, will approve or deny the recommendations only by affirmative action of the Board and will reject a recommendation only if there is clear and convincing evidence that a proposed site does not meet the goals and objectives of the Plan.

8.6 COORDINATION WITH OTHER COUNTY PLANS

The County recognizes the existing flow of solid waste between counties. Inter-county flow and disposal of solid waste will be permitted so long as the governmental units involved develop and implement plans consistent with the County's policies of maximum reliance on reduction, reuse, recycling, and composting and minimal use of sanitary landfills and combustion, and the State of Michigan's hierarchy for solid waste disposal technologies.

As a long-term policy, the County does not intend to become a net importer of solid waste. Proper controls will be established and monitored to avoid such a situation. If the County determines that it has become a net importer of waste, it shall have the ability to restrict that flow of waste into the County. Each disposal facility within the County will be required to report the amount of out-of-County waste received.

Solid waste generated in the Counties of Wayne, Washtenaw, Genesee, Lapeer and Macomb (the Adjacent Counties) is explicitly authorized to be disposed of in existing, licensed landfills located in the County. This disposal of solid waste generated in an Adjacent County will not occur in any existing County landfill unless the Adjacent County, in its solid waste management plan, explicitly authorizes solid waste generated in the County to be disposed of in landfills located in the Adjacent

County. Further, the Adjacent County must demonstrate that capacity exists within its borders to accept Oakland County waste.

Solid waste generated in any of the Adjacent Counties is explicitly authorized to be disposed of in any new landfill in Oakland County, if the established alternate waste processing criteria are met, or in any expansion of an existing landfill located in Oakland County that is licensed after the final approval of the Plan by MDNR, subject to the following conditions:

1. Any municipality in an Adjacent County that desires to have solid waste generated within its borders disposed of in a new or expanded landfill in Oakland County must establish to the satisfaction of the Oakland County Department of Solid Waste Management that it has established and is actively implementing a plan designed to achieve the waste reduction goals established by Oakland County or by the Adjacent County in which such municipality is located, whichever is stricter.

2. The operator of any new landfill, or any expansion of an existing landfill, located in Oakland County that is licensed after the approval of the Plan update by MDNR must enter into an agreement with Oakland County that it will only accept waste from those municipalities in an Adjacent County which have been approved by the Department as being in compliance with the waste reduction goals referred to in paragraph 1 above. These operators must agree and not cause the County to become a net importer of solid waste from the Adjacent Counties.

Further, the disposal in Oakland County of waste generated in Livingston County is explicitly authorized, provided a mutually satisfactory agreement is entered into with the County within one year upon MDNR's approval of this Plan.[6] Because Livingston County has no capacity within its borders, this agreement must guarantee future disposal capacity in Livingston County in exchange for Livingston County's current-use of Oakland County capacity.

Solid waste generated in any Adjacent County or Livingston County is also explicitly authorized to be disposed of in any recycling facility or licensed waste-to-energy facility located in the County when such facilities are not being fully utilized.

Solid waste, including municipal incinerator ash, generated in the County is explicitly authorized to be disposed of in any disposal area in any Adjacent County, in Lenawee County or in Livingston County.

8.7 RESPONSIBILITY FOR PLAN IMPLEMENTATION

The solid waste management plan for the County is presented in Section 8.3 of this Plan. Responsibility for implementation of the proposed plan has been assumed by the County through its Board and County Executive. In order to execute this responsibility, the County sponsored legislation to create the Department of Solid Waste Management. The Department will be established as an additional County department under the control of the County Executive and will be responsible for the oversight of construction and ongoing operations of system facilities. The Director of the Department will be appointed by the County Executive. By a resolution of the Board, the Department will

6\ In concert with restrictions imposed by Livingston County, those materials defined as solid waste under Act 641 may be imported from Livingston County with the following exceptions: ashes, incinerator ashes, incinerator residue, industrial sludges, Type III waste. Hazardous wastes, soil contaminated by hazardous materials, infectious wastes, and other materials of a similar type may not be imported to a Type II facility.

be empowered to construct, enlarge, operate and maintain the County's solid waste disposal system. These powers will be subject to any restrictions placed upon the Department by the Board in the resolution providing for the creation and operation of the Department. Additionally, the Department will function as the coordinator of all solid waste disposal services provided within the County. In this capacity, the Department will provide public education regarding solid waste reduction and disposal methodologies, will collect statistics to enable the County to evaluate its progress toward meeting the stated reduction and disposal goals, will cooperate with and provide technical assistance on solid waste management to communities, and will ensure the ongoing involvement of SEMCOG (the regional solid waste planning agency) through periodic consultation to facilitate coordination with other related plans and programs within the planning region (including, but not limited to land use plans, water quality plans, and air quality plans).

The Solid Waste Board ("SWB"), comprised of representatives of the participating municipalities, will meet at least yearly to provide a forum for consideration of matters pertaining to the acquisitions, operation and management of the system. The Executive Committee of the SWB will meet monthly and will advise, consult with and make recommendations to the County regarding system acquisition, operations and management.

Specific responsibilities will also be required of the individual municipalities. Those municipalities that sign Intergovernmental Agreements ("Agreements") with the County to dispose of waste in system facilities will be required by the Agreements to institute mandatory source separation ordinances to ensure that recyclables are separated by residential, commercial, and industrial generators and waste flow control ordinances requiring haulers to collect and deliver such recyclables from these generators to the appropriate designated facilities. By these Agreements, the municipalities will authorize the County to take an active role in enforcing flow control and source

separation ordinances by monitoring haulers' and residents' compliance and by enforcing the licenses in conjunction with municipalities. The County will bring license violations to the municipalities' attention for revocation proceedings. These communities may choose to require a greater degree of separation and may opt for delivery of recyclables to non-County-owned facilities. Those communities that do not sign contracts with the County may not be allowed to use any of the County's facilities.

Agreements must be signed and source separation and flow control ordinances must be adopted to close gaps in the existing management system to implement the new proposed system.

Three subsystems currently have responsibility for solid waste management in the County: SOCRRA, RRRASOC and the City of Pontiac. SOCRRA, RRRASOC and Pontiac plan to maintain their responsibility for residential waste management within their subsystems (refer to Appendix B for detailed descriptions of SOCRRA and Pontiac system plans). The County, however, will assume responsibility for providing waste disposal services, consistent with this Plan, for the remainder of the County. Thus, for example, the communities within the RRRASOC may have their recyclables processed by a facility they own and still be considered as part of the County's system. Should communities choose to participate in the County's system, appropriate facilities will be available to them.

8.8 FINANCING

8.8.1 IMPLEMENTATION LEGISLATION

The County intends to own the system facilities, except the private recycling centers, and to contract with private firms for their construction and/or operation, except the composting facility(ies). The system will be self-supporting through revenues generated by waste delivered to the various system components to pay bond-holders for any

bonds issued to finance the facilities. The County will contract with the private firms for the processing or disposal of a specified tonnage of solid waste to be delivered to the various system components. However, the County will enter into Intergovernmental Agreements with participating municipalities which will agree to deliver or cause to be delivered to the facilities owned and designated by the County (for recycling only: either County or non-County-owned) all solid waste generated within their respective borders, without including a specific tonnage. The municipalities will be responsible only for controlling waste flow and for paying or causing payment for the processing and disposal services actually provided by the County system. They will not otherwise be obligated or liable to the bondholders to pay for the bonds or to the operators to pay for services.

The County sponsored new legislation to provide a vehicle for financing the proposed solid waste system facilities due to the gaps in current law. Because the County is organized under the optional unified form of county government pursuant to Act 139 of 1973, Act 185 of 1957 cannot be used to finance the proposed system facilities. Act 342 of 1939 does not permit the issuance of county contract bonds, which may result in higher interest costs and disposal fees, nor does it permit the County to act through a department, the proposed Department of Solid Waste Management, under the immediate control of the County Executive. Act 233 of 1955 provides for ownership and control of facilities to be vested in an authority with respect to which the County is only one of several constituent municipalities. Therefore, the County sponsored legislation generally patterned after Act 185, to enable it to finance the proposed solid waste system facilities in a manner consistent with the County's goals and objectives. This legislation was enacted in August 1989 as Act 186 of 1989.

8.8.2 SYSTEM DISPOSAL REVENUES

Disposal rates will be set at a level sufficient, together with the revenues from the sale of recovered materials, and electricity, to generate the revenues necessary to pay all system operating and maintenance costs, the County's administrative costs, debt service requirements and required reserves. The County is currently examining various rate systems including: 1) a uniform rate system with a rebate incentive to promote recycling; 2) a reduced rate at the recycling and composting facilities based on the type and degree of source-separation of the waste delivered; and 3) a rate system based on a combination of charge reduction or rebate plus purchase of or credit for certain recyclables. Based on preliminary estimates, if all of the system's goals are achieved, the system tipping fee would be approximately $60 per ton (in 1994 dollars).

Reiterating, the unified rate structure relates to a system of user charges, i.e., disposal costs for each type of facility. This system-wide approach would allow the County to offer incentives to emphasize recycling and composting.

8.9 CONTINGENCY PLAN

This Plan describes a waste management system that is presently being considered for implementation to meet the needs of the County beyond the 20-year planning period. As currently planned, the County's waste management system will have several components: reuse and reduction, recycling, composting, combustion with energy recovery, and landfilling. If one of these components is disrupted, for instance, if a landfill is closed, then a contingency response will need to be implemented to ensure that the needs of the County are met. The contingency plan presented in this section discusses a general plan for decision making. Specific decisions should be made after considering the given situation and available options.

The following options could be considered for short-term and long-term contingencies:

1. Increasing efforts in recycling and composting;

2. Increasing waste volumes going to operating waste-to-energy facilities in the County;

3. Implementing new waste disposal facilities in the County;

4. Increasing waste volumes going to operating landfills in the County; or

5. Exporting waste to disposal facilities located in other counties.

The benefits and drawbacks associated with each of these options must be considered before a decision is finalized. For instance, waste-to-energy facilities have a limited burning capacity, and often additional waste cannot be directed to them. More intense use of existing landfills could jeopardize future planned landfill space. Increasing efforts in recycling and composting often requires a certain amount of lead time for proper implementation, as does the implementation of a new waste management facility. The final option, exporting excess solid waste, would relieve the County of any immediate County-related disposal concerns. The County recognizes the ongoing flow of solid waste across County borders and includes this contingency as an option in this Plan.

If the need for contingency planning arises, the County must consider all of the options available and identify the most appropriate means of handling the County's waste in the immediate future and in the long-term. It is understood and agreed that proper collection and disposal of solid wastes is a vital concern to health, welfare, and safety of all people in all municipalities in the County. To that end, should any facility in the Plan encounter an emergency, or short-term problems with solid waste

disposal, the other facilities will provide back-up disposal to the extent feasible for the duration of the emergency. Users of other disposal facilities under emergency conditions will be expected to pay those charges ordinarily imposed.

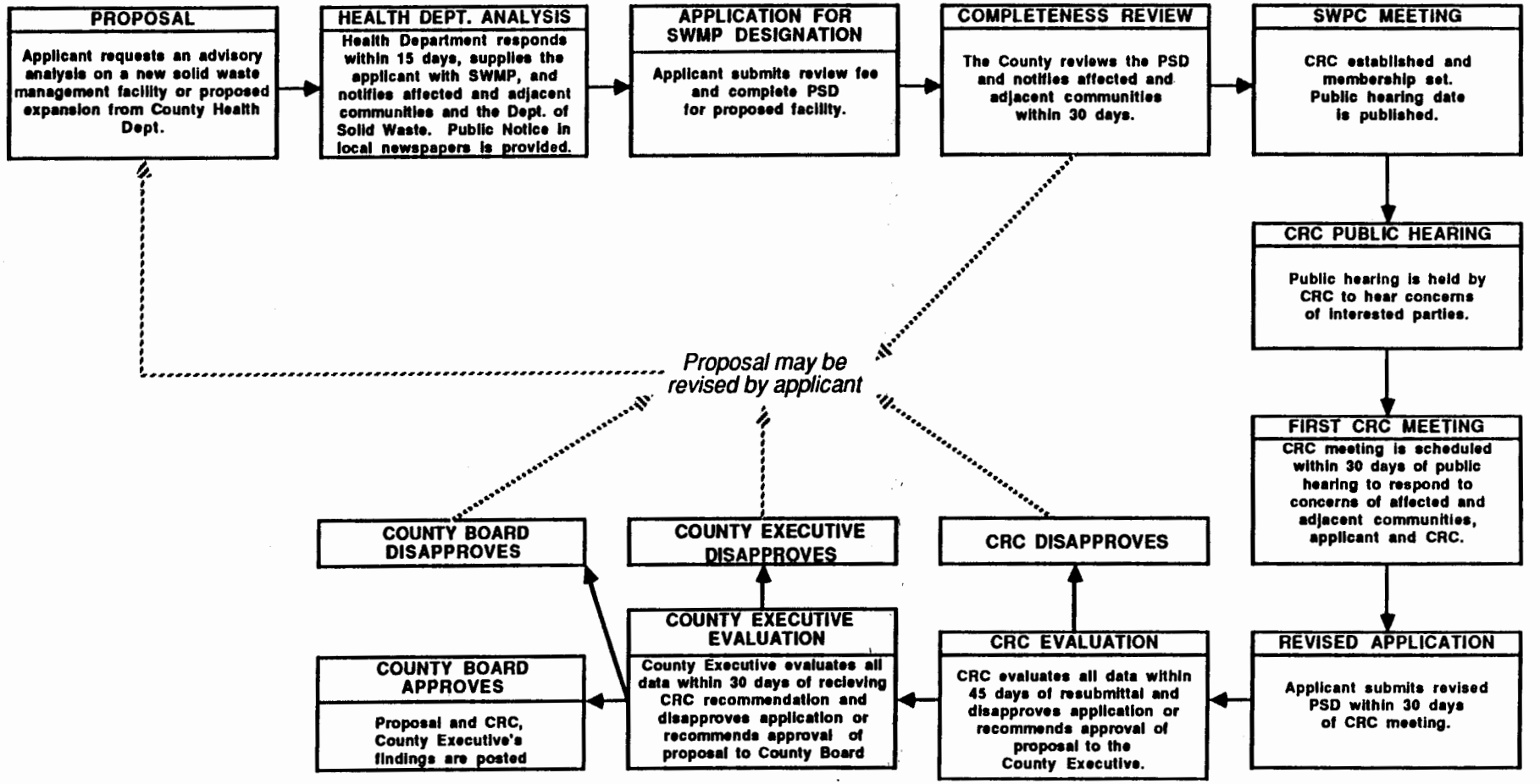
TABLE 8.3-1
WASTE DISPOSAL ESTIMATES

	YEAR 1989	1995	2010
Residential, Commercial, Industrial Waste Generated (TPY)	1,327,000	1,425,000	1,676,000
Waste Composted (TPY)a	0	(71,000)	(84,000)
Waste Reduction (TPY)b	0	(71,000)	(168,000)
Waste Recycled (TPY)c	0	(285,000)	(586,000)
Waste-to-Energy (TPY)d	0	(807,000)	(807,000)
Unprocessed Waste (TPY) to the Landfill	1,327,000	191,000	31,000
Recycling and Composting Residue (TPY)e to the Landfill	0	36,000	67,000
Ash Residue (TYP)f to the Landfill	0	242,000	242,000
Subtotal: Municipal Solid Waste	1,327,000	469,000	340,000
Construction/Demolition Waste (TPY)	141,000	149,000	169,000
Industrial Special (TPY)	444,000	421,000	449,000
Total to Landfill (TPY)	1,912,000	1,039,000	958,000

NOTES: (Percentages below stated in terms of total residential, commercial and industrial waste).

a One or more facilities capable of composting 550 TPD 6 days per week during an 8-month growing season (approx. 5%).
b 5% by 1995, 10% by 2005.
c 1995 20%, 30% by 2000, 35% by 2005.
d 2600 TPD, 85% Availability.
e 10% of the Waste Recycled and Composted is residue.
f 30% of the Waste-to-Energy becomes residue.

FIGURE 8.5-1
FACILITY SITING AND DESIGNATING PROCESS



NOTES:

SWPC	Solid Waste Planning Committee
SWMP	Solid Waste Management Plan
CRC	County Review Committee
PSD	Project Submittal Documents (Preliminary Environmental Assessment & CRC Evaluation Parameter Discussion Document)

9.0 PUBLIC PARTICIPATION PROGRAM

9.1 OVERVIEW

In accordance with state law, the County has encouraged the participation and involvement of the public and the municipalities in the development and implementation of the Plan. The County has maintained ongoing communication with the MSWB, SOCRRA, and RRRASOC.

A mailing list has been developed to disseminate information relating to the County's Solid Waste Management Plan development,[1] including all municipalities, affected public agencies, the private sector, and other interested parties.

1/ The mailing list is summarized below:

1. All members of the Solid Waste Planning Committee
2. All adjacent and neighboring Counties
3. Any consultants
4. County Commissioners
5. County Executive and Staff
6. Landfill Operators
7. Members of the Solid Waste Industry
8. All Cities, Townships and Villages of Oakland County
9. Any Other Interested Citizens and Special Interest Groups

A more specific breakdown of this list is available from Oakland County's Solid Waste Division of the Public Works Department. Anyone interested in being added to the list may contact this department.

9.2 SOLID WASTE PLANNING COMMITTEE

Act 641 requires the establishment of a solid waste planning committee to assist in the preparation of the Plan by providing advice and consultation, including:

- Reviewing planning agency's work program.
- Identifying local policies and priorities.
- Insuring coordination and public participation.
- Advising counties or municipalities.
- Reviewing work elements.
- Approving the Plan.

The planning committee is also intended to assure that the planning agency is fulfilling all of the requirements of Act 641 and its rules with regard to content of the Plan and public participation.

The planning committee must be appointed for a two-year term and be composed of 14 people from the following areas of interest:

- Four members from the solid waste industry.
- Two members from environmental interest groups.
- Three members from the general public who reside in Oakland County.
- One member to represent County government.
- One member to represent city government.
- One member to represent township government.
- One member to represent the regional solid waste planning agency.
- One member to represent industrial waste generators.

The 14 person committee and six non-voting advisory members were reappointed by the Board in 1988 and 1990.[2]

2/ The present members of this committee are:

Solid Waste Industry		
Nick Madias	-	M & E Trucking Company
Bob Ryan	-	Best Way Recycling/Waterford Hills Landfill
Ron Baker	-	Waste Management, Inc.
Thomas Waffen	-	SOCRRA
Industrial Waste Generator		
Jerome Amber, P.E.	-	Ford Motor Company, Dearborn
Environmental Interest Groups		
Mary Shaw Moore		
Robert Seccombe		
General Public		
James Meenahan, P.E.	-	Environmental engineering staff with General Motors
John King		
David Stinson		
County Government		
Lawrence Pernick	-	County Commissioner (assumed position from Alexander C. Perinoff, deceased August 1987)
City Government		
Edward Leininger/ Lenora Jadun (designated alternate for Leininger)	-	City of Novi
Township Government		
JoAnn Van Tassel/ Ardath Regan (designated alternate for for Van Tassel)	-	Orion Township/Village of Holly
Regional Solid Waste Planning Agency		
Ted Starbuck		Southeast Michigan Council of Governments (SEMCOG)

The non-voting advisory members appointed to the solid waste planning committee are:

o Thomas Biasell	-	Director Department of Public Services, Farmington Hills
o Michael Miller	-	Wayne Disposal

(Footnote 2 continued on next page)

James Meenahan was re-elected to serve as chairperson of the planning committee.

Pursuant to Act 641, on April 1, 1987, the planning committee members (both voting and non-voting) were informed of the date, time and location of the first SWPC meeting for discussing the Plan update.

On April 21, 1987, a letter of notification was sent to all chief elected officials of the County, all municipalities in Oakland County, Oakland County Board of Commissioners, solid waste industry in Oakland County (collectors, haulers, landfill operators), and any other interested parties.[3]

All documents related to the Plan were maintained at the Oakland County DPW offices for the public to review.

Act 641 specifies that public meetings with the planning committee shall be held not less than quarterly each year during plan preparation. Table 9.2-1 contains a list summarizing the meeting dates of the planning committee.[4]

A summary of the meetings of the planning committee is provided in Exhibit 9-2, located at the end of Section 9.

2\ (Footnote continued from previous page)

- o Claudia Filler - Pontiac Sanitation Department
- o George Karas - Retired plant engineer, Oakland University
- o Sandra Dyl
- o Chester Koop
- o Michael Tyler

3/ Section 27(c) of Act 641 requires that the County planning agency notify the chief elected officials of each municipality in the County and any other person desiring notification not less than ten days before each public meeting if the Plan is to be discussed and indicate as precisely as possible the subject matter to be discussed.

The letter of notification was intended to inform the above mentioned persons of the date, time and location of the first planning committee meeting called to discuss the Plan update. Subsequent notices of meetings and meeting agendas were also sent to the above-mentioned parties at least ten days prior to the meeting. A general form letter of notification for each planning committee meeting is provided in Exhibit 9-1, located at the end of Section 9.

4/ Table 9.2-1 is located at the end of Section 9.

EXHIBIT 9-1

FORM LETTER OF PLANNING COMMITTEE

MEETING NOTIFICATION

(Date)

Act 641 Oakland County Solid Waste Planning Committee,
Chief Elected Officials - All Municipalities in
Oakland County,
Oakland County Board of Commissioners,
Solid Waste Industry in Oakland County,
Other Interested Parties

Re: Update of Oakland County Act 641
Solid Waste Management Plan

Ladies and Gentlemen:

The state law (Act 641 of P.A. 1978) requires updates to the County solid waste plans every five years.

A meeting of the Oakland County Board of Commissioners appointed Solid Waste Planning Committee (SWPC) and the County designated planning agency (Daniel T. Murphy, County Executive, and selected staff) will be held on (date of meeting) at 7:30 P.M. in the Board of Commissioners' Auditorium. The meeting agenda is as follows:

(agenda items)

If you have any questions, please call me at 858-1087.

Sincerely,

Gerald L. Miley, P.E.
Chief Engineer, Solid Waste Unit

Each agenda included time for questions and comments from the general public.

Included in the package with the next planning committee's agenda was the last meeting's minutes, any technical elements of the plan that were prepared, and correspondence.

TABLE 9.2-1
MEETING DATES OF SOLID WASTE
PLANNING COMMITTEE

May 11, 1987	October 13, 1988
June 8, 1987	December 1, 1988
September 3, 1987	February 2, 1989
October 1, 1987	May 4, 1980
November 5, 1987	May 18, 1989
December 3, 1987	June 1, 1989
January 7, 1988	June 20, 1989
February 4, 1988	September 28, 1989
March 3, 1988	November 2, 1989
April 7, 1988	November 8, 1989
May 5, 1988	November 30, 1989
June 2, 1988	December 7, 1989
June 30, 1988	April 5, 1990
August 4, 1988	April 25, 1990
September 1, 1988	May 10, 1990
	June 14, 1990

The Public Hearing on the Plan was held on March 1, 1990 (conducted by the designated planning agency).

EXHIBIT 9-2
SUMMARY OF PLANNING COMMITTEE MEETINGS

May 11, 1987

- Election of officers.
- Discussion of Plan and need for Plan update.
- Discussion of the existing conditions.

June 8, 1987

- Discussion of schedule of future meeting dates.
- Discussion of proposed work plan for recycling subconsultant.

September 3, 1987

- Discussion of schedule for Plan update.
- Review of the "Outline for Update for Solid Waste Management Plan."
- Review of proposal to hire consultant to prepare Plan update.
- Appointment of Recycling Subcommittee.
- Presentation from Waste Management of North America, Inc. to expand Eagle Valley Landfill.

October 1, 1987

- Presentation of guidebook entitled, "Recycling and Composting in County Solid Waste Management Planning."
- Discussion of goals and objectives of Plan.

November 5, 1987

- Discussion of goals and objectives of Plan.
- Report from Southwestern Oakland County Solid Waste Consortium.
- Discussion of inter-county waste flow.

EXHIBIT 9-2 (Continued)
SUMMARY OF PLANNING COMMITTEE MEETINGS

- Report from Recycling Subcommittee on recommendations to the proposed work plan for the Plan.

December 3, 1987

- Discussion of proposed goals and objectives of Plan update.
- Recommendations by recycling subcommittee.
- Recommendations on proposed recycling work program.
- Discussion of inter-county flow of waste.

January 7, 1988

- Recycling subcommittee report.
- Discussion of proposed contract with recycling subcontractor.
- Discussion regarding procurement and operation of the Kent County waste-to-energy facility.
- Discussion of Lyon Land Development Landfill.

February 4, 1988

- Solid Waste Management Plan preparation status report.
- Presentation by Resource Recycling Systems on proposed recycling study.
- Report from Southwestern Oakland County Solid Waste Consortium
- Discussion of inter-county flow of waste.

March 3, 1988

- Redesignation of Lyon Land Development Company Landfill, Wayne Disposal - Oakland Landfill, and Pontiac Collier Road Landfill.
- Approval for recycling study for Oakland County by Resource Recycling Systems.

EXHIBIT 9-2 (Continued)
SUMMARY OF PLANNING COMMITTEE MEETINGS

April 7, 1988

- Discussion of recycling subconsultant's work.
- Presentation of preliminary results of solid waste generation projections.
- Presentations regarding Holly Sanitary Landfill, Eagle Valley Landfill, and Waterford Hills Landfill.
- Redesignation of the above three landfills.
- Planning committee action to recognize Waterford Hills Landfill as a Type II facility in Plan update.

May 5, 1988

- Further discussion of the redesignation of the Holly Landfill.
- Presentation of the waste generation estimates.
- Redesignation of SOCIA landfill.

June 2, 1988

- Presentation by Marlowe Landfill to request redesignation.
- Redesignation of General Motors refuse processing facility.
- Presentation of sections of the Plan discussing existing disposal facilities, current collection and disposal practices in Oakland County communities, available solid waste management alternatives, recycling, and management components in the County.
- Report from Municipal Solid Waste Board regarding implementation of the Plan.
- Discussion of Michigan House Bill 5581.

EXHIBIT 9-2 (Continued)
SUMMARY OF PLANNING COMMITTEE MEETINGS

June 30, 1988

- Group from Madison Heights called Clean Air Please (CAP) voices concern over the SOCIA incinerator.
- Redesignation of Marlowe Landfill.
- Report on status of Plan update preparation, presentation of complete Table of Contents.
- Discussion of waste import and export estimates for Oakland County.
- Presentation of Systems Alternatives Analysis for Oakland County's Plan.

August 4, 1988

- Presentation of slide show being shown to municipalities in County on solid waste management and recycling.
- Presentation of Introduction, Description of SOCIA Incinerator and GM Incinerator, Waste Import and Export, Wastewater Treatment Sludge, and Analysis of Solid Waste Management Alternatives sections of the Plan.
- Discussion of Criteria and Procedures for Siting Future Solid Waste Facilities, another section of the Plan.

September 1, 1988

- Discussion of Criteria and Procedures for Siting Future Solid Waste Facilities - Siting Criteria Subcommittee appointed.
- Status report provided concerning implementation activities for the solid waste management plan.
- Presentation of revised waste generation data.

EXHIBIT 9-2 (Continued)
SUMMARY OF PLANNING COMMITTEE MEETINGS

October 13, 1988

- Report on activities of planning committee subcommittee to draft criteria and procedures for siting future solid waste facilities.
- Report and recommendations from the recycling subcommittee.
- Action to accept recycling subconsultant's report.

December 1, 1988

- Discussion of the strategy for waste recycling and composting in Oakland County and the proposed role for County government in that strategy.
- Discussion of Criteria and Procedures for Siting Future Solid Waste Facilities.
- Report on implementation activities - negotiations for a contract to construct a waste-to-energy facility.

February 2, 1989

- Presentation by Clarkston Disposal to include a transfer/recycling facility in Plan update.
- Presentation by North American Environmental Services, Inc. to include a facility for processing demolition debris in the Plan update.
- Report of activities of recycling subcommittee.
- Presentation and discussion of Plan update "Development of Selected Solid Waste Management Alternative" section.
- Discussion on inter-county flow of waste.
- Report on review of siting criteria and procedure for future solid waste facilities.

EXHIBIT 9-2 (Continued)
SUMMARY OF PLANNING COMMITTEE MEETINGS

May 4, 1989

- Public comments were received regarding "grandfathering" of previously designated landfill sites.
- Report was given regarding material recovery strategies for the County.
- Draft Plan Update was presented.
- Implementation activities were discussed.

May 18, 1989

- An all-day working session was held to comment on Draft Plan Update.

June 1, 1989

(Afternoon Session)

- Committee considered requests by private recycling companies to be included in the Plan Update, and designated a site for Clarkston Disposal's Recycling/Transfer facility.
- Committee formally accepted the report "Material Recovery Strategies for Oakland County" as a recycling source document.
- Discussion of the present Plan policy that restricts the number of landfills that may be located in any one township.
- Committee designated the landfill site in the Plan Update that has yet to be identified by the L.S.A.C. criteria and methodology and approved by the County Board of Commissioners.
- Committee designated in the Plan Update up to a 30 acre site in one of the Consortium communities for a material recovery facility.

EXHIBIT 9-2 (Continued)
SUMMARY OF PLANNING COMMITTEE MEETINGS

(Evening Session)

- Public comments were received regarding designation of Holly and Marlowe Landfill sites.
- Motion defeated to include policy from present Plan restricting the number of landfills located in a community.
- Comments presented on Draft Plan Update.
- Considered incorporation of LSAC criteria into Plan Update and criteria for future designation of sites or expansions.
- Amended present Plan to designate waste-to-energy facility site in Auburn Hills.
- Suspended future committee meetings until LSAC completes its work: develops criteria and proposes a County landfill site.

June 20, 1989

- Committee released for public review on amendment to present Plan to include an alternate site for the County waste-to-energy facility and provide up to 2,000 tons per day capacity.

September 28, 1989

- Committee approved amendment to present Plan to include an alternate site for the County waste-to-energy facility in Auburn Hills, Michigan.

November 2, 1989

- o Committee approved designation of 125 acres of land for disposal for the BFI/Marlowe Type II Landfill.
- o Committee approved designation of the BFI/Marlowe materials recovery facility.
- o Committee denied the Board of Commissioner's request to establish a landfill moratorium in the County.

November 8, 1989

- o Committee approved designation of Holly Disposal, Inc. Type II Landfill.
- o Committee approved designation of the Eagle Valley Landfill (Expansion), Type II facility.

November 30, 1989

- o Committee approved designation of the following facilities:

Type II Landfills (Existing, Permitted and Designated) SOCRRA
SOCRRA Existing
Pontiac - Collier Road
Wayne Disposal - Oakland
Eagle Valley - Existing
Waterford Hills
Lyon Land Development

Waste-to-Energy (Existing and Designated)
County - Auburn Hills
General Motors - Pontiac

Transfer Stations (Existing and Designated)
County - Auburn Hills
Southeastern Oakland County Resource Recovery Authority - Troy
Clarkston Disposal
Laidlaw - Southfield

Materials Recovery Facilities
County - Auburn Hills
SOCRRA - Troy
Clarkston Disposal

- o Committee approved designation of SOCRRA's waste-to-energy facility site in Madison Heights
- o Committee approved designation of SOCRRA's landfill expansion in Rochester Hills.
- o Committee approved designation of Holloway Type III Landfill in Novi.

December 7, 1989

- o Committee Approved designation of Pontiac's material recovery facility and composting facility sites.
- o Committee approved for designation the Consortium's four potential sites for a materials recovery facility/transfer station/drop-off household hazardous waste facility, with the understanding that one of the four sites would be named as the final site in the final Plan.
- o Committee approved interim siting criteria - Section 8.5 of Plan.
- o Committee released for public review the Plan Update.

April 5, 1990

- o Committee reviewed and discussed changes to the draft Plan Update based on public comment. The following changes were made:

  - Remove reference from 40-year County-owned landfill from the document; replace with concept of County supplementing existing private/public facilities to meet 20-year capacity goal.

  - Remove Holly Disposal Landfill in Holly Township from Plan Update.

  - Remove Holloway Type III Landfill in Novi Township from Plan Update.

APPENDIX A

DATA FROM
MATERIAL RECOVERY STRATEGIES
FOR OAKLAND COUNTY, MICHIGAN

(RESOURCE RECYCLING SYSTEMS, 1989)

SECTION II

MARKET ASSESSMENT

It is frequently noted that diversion of newspaper, corrugated cardboard, or glass from the waste stream is not recycling--recycling only takes place when a paper mill or glass plant actually receives the material and uses it to make new products. The point is well taken--that the potential for recycling is driven by the availability of markets for recycled materials. Without the final marketing of the recovered materials, the recycling is not legitimatized.

Markets have historically been unstable for certain recycled materials because of difficulties in generating consistent supply. Today with solid waste issues in the forefront, consumers, interest groups, and state and local governments are urging recycling and the use of recycled products to curb increasing disposal problems. The State of Michigan has plans to pump in excess of $25 million dollars into market development for recycled materials. With the increased awareness and activity in recycling, market development is rapidly accelerating and that trend is expected to continue.

Some problems associated with the marketing of recycled materials can be attributed to poorly designed or poorly promoted recycling systems which eventually fail, thereby creating a reluctance on the part of manufacturers to consider depending on recycled inputs. In order for the materials to be desirable as replacements for virgin inputs, they must be readily and consistently available over long periods of time, and must meet quality specifications, while being competitively priced.

In this section a detailed summary of market availability and specifications for a wide variety of materials will be provided. Price histories will be documented and price projections made for the future. This information will be used to select a set of target materials and to project their estimated value in future years. From these projections further program design and analysis can be completed in later sections of this report.

CONSIDERATIONS IN A MARKET ASSESSMENT

The previous section discussed the structure of the marketing system. Processors, dealers and end users have historically worked together to pull recyclable material into the material recovery system. The price paid for the material has served as the "pull" mechanism--an economic incentive that is used to pull recyclable material through the system and regulate that flow to match supply with demand.

Marketing is often handled through a broker who will seek out those manufacturers currently buying recovered materials, and will provide market

specifications to the generator, which indicate how the materials must be prepared. Manufacturers sometimes deal directly with the generators, but will generally prefer dealing with materials from a broker because quality control is better insured and significant volume is guaranteed.

Dealing directly with manufacturers is possible when significant volumes of material are assembled, and is a very viable course of action for a countywide program. The choice of working through a dealer, processor or directly with an end-user market must be made on a material-by-material basis after the scope of the proposed material recovery program has been determined.

With more public sector involvement in recycling and material recovery, the old "pull" system--relying on price as an incentive and flow regulator--begins to break down. These public/private recycling initiatives are instead relying on a "push" strategy to remove material from the waste stream--their principal motivator being the avoided cost of traditional disposal--not the price paid for the recyclables.

Under these conditions the dealer-processor-end user structure has and will continue to change. Large processors will enter into the public/private initiatives. Small and specialized processors will find niches in high-return materials (high-grade papers) or materials where they hold a dominant position in a region (concrete crushing, glass cullet, metals, etc.).

Capturing the value of avoided disposal costs will be a driving force in the material recovery industry for many decades. Recyclables will be "pushed" into the marketplace and the end users will have less control over regulation of that flow using pricing mechanisms. While the price paid for the material will decline, its steady supply and lower price will lead to higher and more consistent consumption by end users. Secondary materials will become the primary feedstock in many mills and manufacturing plants, with use of virgin materials fluctuating with the economy--a reversal of the historical situation. In the long run the increase in value of recycled materials (price plus avoided disposal costs) will be beneficial to both the manufacturers and to the material recovery efforts of the County.

These considerations, along with a number of market factors identified below, must be taken into account in assessing the market for a particular product and evaluating whether to include that product in a proposed recycling strategy. Selection of markets involves balancing the costs, benefits, risks and uncertainties of market specifications, price, location, services, capacity and stability. A discussion of these factors follows.

MARKET SPECIFICATIONS

The requirements of the end user, or market, determine the type of processing necessary (and the cost) for each type of material recovered. More stringent specifications will require more processing, involve greater risks of rejected loads and be generally more difficult to meet.

Market specifications will vary among end users for each material depending on their specific end use--what will ultimately be produced from the recycled materials--and on the manufacturing process used. Manufacturers for particular markets may have stringent specifications that they require for materials. "Contamination" is the term used in measuring the quality of materials, referring to the amount of impurities, or non-specific materials mixed in with the desired material. The more contamination present, the lower the grade and the lower the price paid. Some products have fairly standard processing requirements for markets, while others vary from one manufacturer to the next.

The impact of greater volumes of recyclables being pushed into the marketplace can vary from material to material. Glass cullet users, for example, took steps to add cullet cleaning equipment (called "beneficiation systems") to their facilities and were able to significantly increase the volumes of cullet that they could purchase while easing their material specification requirements. While this same strategy has been seen in the fibres industry, the opposite is more common--specifications tighten for paper products because the end user can be more selective. This is one of the primary arguments for using a push strategy that includes a heavy emphasis on source-separated or commingled recyclables--the higher quality of source-separated materials putting the program in a better long run marketing position.

MARKET LOCATION AND TRANSPORTATION REQUIREMENTS

These factors influence the equipment requirements and allocation of costs that are needed to work with a particular market. Selecting markets with low transportation costs can be a guiding factor. Frequently, though, markets will compensate for these costs with a higher price or by providing certain market services as outlined below. The export market has been very strong in recent years, despite the distant locations, because of these offsetting benefits of price, currency exchange value, and marketing services provided by overseas end users.

Developing processing capability that provides a number of options in transportation mode (truck, rail, ship) and method of containerization (shredded, export bale, loose, etc.) will give the most flexibility in marketing--a valuable asset.

MARKET PRICES

Price has historically driven the recycling industry. While the importance of price will decline due to the stronger value given to avoided disposal costs, it is still a critical decision factor in market selection. Prices for a specified pack of material will vary considerably from market to market--requiring a careful comparison of all markets before selecting a particular end user's offer. As mentioned earlier, other factors must be weighed in considering a price. These include degree of processing required, quality specifications, transportation requirements, value of added services provided by the market, term of agreement, provisions for floor price, and more.

Prices will fluctuate over time--the much discussed variability of recycling markets is actually referring to the variability of the price paid for recyclables. Certain materials, paper products especially, vary considerably more than other materials, such as glass cullet. Projections of price used in program planning must take these fluctuations into account--use of a long term average price provides a fair basis for feasibility assessment and selection of processing technology. The accounting structure set up for an operating material recovery program should include a mechanism for cash set-aside during peak markets and cash draw-down during poor markets. Further, a properly designed program should include a stable revenue stream based on the avoided disposal cost benefits--preferably based partially on maintaining the processing capacity (a debt service payment) and partially based on the actual utilization of that capacity (a volume based operation and maintenance [O&M] payment).

Peak price conditions make the spot market very attractive. Poor price conditions make a long term agreement with a floor price even more attractive. In selecting a market for a material, long term contractual arrangements will be beneficial for highly fluctuating markets while the spot market will be a better arrangement for stable markets. As with any modern commodities market--participation requires a careful assessment of the right approach for each material.

MARKET SERVICES

In certain cases, an end user may be willing to provide additional services to assist either in the development of processing capacity or in lowering operating costs. A common method is to provide for all transportation costs--a paper mill contacts their own contracted hauler to send a semi for baled newsprint--or a glass plant spots a 40-cubic-yard dumpster for receiving glass cullet. Another common method is to provide a processing equipment loan (glass crusher, can flattener or paper baler) with the loan paid off through a credit on material delivered to the market. These benefits can be leveraged

only from certain service-oriented markets and only when sufficient volume is being generated to justify the arrangement. As noted before, price paid for the recyclables will be affected by such agreements.

As with market specifications, the impact of greater volumes of recyclables being pushed into the marketplace will have an effect on the level of market services that can be leveraged. Again, both extremes have been observed--certain markets increasing services to reach certain goals (eg: standardizing shipping containers), while other markets eliminate services as an unnecessary business expense.

MARKET CAPACITY AND STABILITY

A number of factors that are part of market selection can be grouped in the general category of market capacity and stability. When selecting a material to be recycled, consideration should be given to the scope of market demand for the material. How much total tonnage is currently consumed in the United States? How much in export markets? What products are made from the recycled feedstock? What trends are impacting use of those products? Will substitute materials impact the future of that market? How sensitive is consumption of that product to the overall economy? How many mills currently use that recyclable material--a small number of large users or a large number of small users? Which of these end users are most suitable to your needs?

A similar set of questions must be asked about your own operation. How reliable a source of supply are you going to be? What volumes can be delivered? What quality specification are you trying to meet? Are you a big supplier relative to market supply--or a small supplier? What other suppliers are in your area and how does your volume compare to theirs? How strong a commitment has been made to the program--has a stable financial base and an adequate facility been capitalized?

Matching your source of supply with the end user's demand is the challenge. A large high-volume, well established market with a strong commitment to recycling a particular material is going to be looking for suppliers with similar characteristics.

Answers to these questions will help determine the best way to market a particular material. Some guiding principals: More than one end user is needed for an unstable market or for small markets--dealer/broker assistance and spot market strategies may be helpful. If your facility is handling only a small volume of material and cannot justify the necessary shipping or processing investment, a middleman processor may be needed when this capital investment to available volume ratio is high. If only a few high-volume end users exist for one of your high-volume materials, your

equipment should have the flexibility to change material specifications if needed to guarantee contingency markets. These and other similar marketing tactics are a necessary part of a comprehensive recycled materials marketing strategy.

MATERIAL-SPECIFIC REQUIREMENTS

The following materials are typically found in the waste stream and have been identified as having recycling potential.

PAPER

LOW-GRADE FIBERS	HIGH GRADE FIBERS
Old Newspapers (ONP)	Computer Printout (CPO)
Old Corrugated Containers (OCC)	White Ledger
File Stock	Colored Ledger
Mixed Paper	

METALS

LOW-GRADE FERROUS	HIGH GRADE NON-FERROUS
Steel	Aluminum
Iron	Copper
White goods (large appliances)	Lead
Tin Cans	Brass

OTHER PACKAGING MATERIALS

GLASS	PLASTIC
Flint (clear glass)	High Density Polyethylene (HDPE)
Green	Low Density Polyethylene (LDPE)
Amber (brown glass)	Polyethylene Terephthalate (PET)
Mixed (green and amber)	

COMPOSTABLE WASTE

HOUSEHOLD	COMMERCIAL/INDUSTRIAL
Leaves	Landscape Waste
Grass Clippings	Food Waste
Brush/Prunings	Organic Process Waste
Food Waste	
Small Diameter Wood Waste	

SPECIAL WASTES

MUNICIPAL SOLID WASTE	CONSTRUCTION/DEMOLITION
Used Oil and Batteries	Concrete, dirt and asphalt
Scrap Tires	Metals
Textiles	Old Corrugated Containers
Household Hazardous Wastes	Wood

PAPER

In the United States approximately 83 million tons of paper and paperboard were consumed in 1987 according to the Official Board Markets. Seventy-three million tons of this were produced domestically and 10 million tons imported. An estimated 29 percent of this consumed tonnage was recovered as waste paper. Of this 24 million tons, 19.5 million tons were then used to produce fibre products in the United States, with another 4.5 million tons of waste paper exported to overseas markets.

Projections by the Official Board Markets are that total domestic paper and paperboard consumption will increase steadily to 94 million tons in 1992 and 115 million tons in the year 2000. During the last ten years total waste paper consumption has increased 46% with a significant portion of this growth taking place due to increased export to overseas markets.

In Michigan there are 25 paper, paperboard and cellulose insulation manufacturers according to a 1987 study by Franklin Associates. An additional 22 facilities are located in adjacent states and provinces within 50 miles of the Michigan border.

Estimates for 1985 from the same study indicated that a total of 900,000 tons of waste paper were consumed by Michigan mills alone that year. Of the 22 out-of-state facilities near Michigan's border, 6 are located in Illinois where an estimated 750,000 tons of waste paper were consumed in 1986 according to the American Paper Institute. Oakland County recycling programs can expect to market material to these mills, as well as export markets in Mexico and Asia.

Three major waste paper processors operate in the Southeastern Michigan Area. These include Great Lakes Paperstock in Roseville, Nelson Paper Recycling in Romulus, and Royal Oak Waste Paper in Royal Oak. Other well known processors from outside the area have begun to make business contacts in the region, including Jackson Fibers and Padnos Iron and Metal. A number of large volume dealers and mill buyers also are available to assist in brokering waste paper to markets in the United States and overseas.

Old Newspapers (ONP)

Collection: Old newsprint has been the most commonly recycled item in residential drop-off, multi-family and curbside programs. Newspapers may either be bundled, bagged or handled loose in collection programs. Bundling involves securely tying together a standard-size stack of newspapers, usually 8-12" in height. Standard-size brown paper bags may also be stuffed with newspapers in place of tying. If appropriate containers are provided, loose newspapers could be accepted.

Storage: ONP must be kept dry and, therefore, stored indoors, or kept covered if stored outdoors. Wet ONP loads will be rejected. Extended storage or exposure to sun should also be avoided as much as possible. As papers age they discolor, and some markets will not accept them once they have turned yellow.

Processing: Paper products including ONP generally need to be baled in preparation for shipment to market. A high volume auto-tie baler designed specifically to bale "de-ink" or Number 1 grade ONP can produce a newsprint bale every three to five minutes.

Loose newspaper is shipped primarily by suppliers within close proximity to a plant, although some suppliers are able to ship loose news longer distances under backhaul arrangements when the local newspaper is also a customer for the new newsprint.

Marketing: A reasonably strong market for ONP can be expected in the Great Lakes area. ONP consumption, domestic and export, comprised 18 percent or 4.3 million tons of the 24 million tons of waste paper recovered last year in the U.S.. Potential large volume end users in the Michigan area include the following:

FSC Paper, of Alsip, Illinois produces "new" newsprint from old newspapers and buys approximately 125,000 tons of ONP each year. The new newsprint is sold to publishers throughout the midwest including newspapers in Chicago, Grand Rapids, and Muskegon. The firm has been unsuccessful in attempts to market their product to Detroit area papers, which have been using imported newsprint from Canada for many years.

The grade of used newsprint purchased by the plant is referred to as "deink news". Specifications for this grade place strict limits on moisture and yellowing (age) and allow only minimal amounts of other papers or "contaminants". Higher levels of contamination will cause a load or bale to be rejected.

Michigan Paperboard Corporation of Battle Creek, MI produces paperboard and consumes approximately 45,000 tons of ONP each year--usually of the #1 news grade which has less stringent contamination restrictions than deink news.

Waldorf Simplex Products Group of Battle Creek, MI produces paperboard and consumes approximately 30,000 tons of ONP each year.

James River Corporation of Kalamazoo, MI produces boxboard and consumes approximately 25,000 tons of ONP each year.

Manistique Papers of Manistique, Michigan, owned by Field Corporation of Chicago, produces about 45,000 tons of 100 percent recycled newsprint each year and uses a mix of half ONP and half groundwood speciality papers.

Various Cellulose Insulation Manufacturers in Michigan are estimated to use approximately 30,000 to 40,000 tons per year of ONP.

Corrugated Cardboard (OCC)

Collection: Old corrugated cardboard comprises over half of the wastes for many wholesale and retail commercial establishments as well as large manufacturing facilities. Many of the major chain grocery stores and large auto plants already have installed baling equipment for their OCC and take bids from brokers for moving the material to market from all their facilities in a region.

Smaller generators of OCC have a more difficult time moving OCC to market. With volume too small to attract brokers, the only options left are to work with a trash hauler that offers special OCC pickups or with a processor willing to site a smaller baler at the outlet.

Storage: OCC, being primarily boxes, is most efficiently stored with boxes broken down (either taken apart and flattened or compacted with on-site equipment). Since the material is bulky, space restrictions must be considered in selecting containers and determining the required schedule for servicing containers. Moisture limits are not as critical (unlike newsprint) and higher density baling is possible with wet OCC. This allows for outside storage without much concern for the weather. Typical contaminants that are limited by OCC specifications include waxed cardboard (eg: fruit/vegetable boxes), plastic shrinkwrapped cardboard, miscellaneous plastic/wood residue, and boxboard (eg: cereal boxes). Staples and strapping tapes are acceptable since they can be separated out in the processing.

Processing: All OCC is received by the mills in bales--either shipped directly from generators with baling capacity or from packers/processors. Loose OCC from small generators will need to be transported from collection/storage containers to the processors where large automatic balers, some equipped with a "hogger"--high speed cutting knifes to chop up large pieces--producing a higher density bale.

Loose or compacted OCC is delivered to the processing facility via roll-off containers, stake trucks with hydraulic dump, or standard refuse collection vehicles for processing as described above.

Marketing: OCC consumption, domestic and export, made up 47 percent or 11.3 million tons of the 24 million tons of waste paper recovered last year in

the U.S.. High volume markets for OCC are well established in the the Great Lakes region. A large number of mills in the region will buy OCC, and suppliers usually experience little difficulty in finding a buyer even in times of low market prices. In Michigan alone, 13 mills purchase nearly 600,000 tons of OCC per year.

The OCC is processed and used to make new cardboard and linerboard In some cases a mill will blend pulp derived from OCC with pulp from other grades of waste paper for the manufacture of a 100 percent recycled product. Potential large volume end users in the Michigan area include the following:

Simplex Products Group of Constantine, MI produces chipboard and consumes approximately 35,000 tons of OCC each year.

Packaging Corporation of America in Filer City, MI produces corrugated medium and consumes approximately 85,000 tons of OCC each year.

James River Corporation of Kalamazoo, MI produces boxboard and consumes approximately 90,000 tons of OCC each year.

Jefferson Smurfit Paperboard in Monroe, MI produces linerboard and chipboard and consumes approximately 30,000 tons of OCC each year.

Union Camp Corporation in Monroe, MI produces tube stock and linerboard and consumes approximately 80,000 tons of OCC each year.

Stone Container Corporation of Ontonogan, MI produces corrugated medium and consumes approximately 60,000 tons of OCC each year.

Mead Corporation of Otsego MI produces combination paperboard and consumes approximately 55,000 tons of OCC each year.

Menasha Corporation of Otsego MI produces corrugated medium and consumes approximately 80,000 tons of OCC each year.

High-Grade Papers--Computer Printout, White and Colored Ledger

High-grade consumption, domestic and export, comprised 23 percent or 5.5 million tons of the 24 million tons of waste paper recovered last year in the U.S.. High-grade papers are often referred to as "office papers," because they are typically generated in large quantities by all types of offices. Wastepaper is broken down categorically by the various markets into numerous distinctions which are dependant upon the final product being produced. The categories most often collected as high-grade include: computer printout (CPO), white ledger, and colored ledger.

Collection: High-grade paper comprises roughly 75% of the typical office waste stream, and is the most highly valued paper product due to the long fibers in the paper. Much of the collection, storage and initial processing is similar for the various grades of paper, with the main difference being the extent of separation at the source. Paper collection containers appropriately designed to minimize contamination by refuse are most suitable. These range in size depending on the point of generation targeted and the needs of the generator. Generally accepted definitions for each category are listed under the respective sections.

CPO Computer printout paper will largely be collected from finance, real estate, legal, technical, and institutional computing centers, labs, work stations and administrative offices. This grade of paper is generally collected separately from other "office type" papers, although commingling with high-grade papers for later hand picking is also practiced.

White ledger includes most white typical office papers. Included are white photocopy paper, white letterhead, notecards, computer cards, envelopes (without plastic windows and adhesive labels) and books with the glue/bindings cut off. As a rule, for the higher grades of paper, all materials must be water soluble. This grade must be free of treated, coated (glossy), padded or heavily printed (large inked areas) stock.

Colored ledger has the same specifications as white ledger but also includes all colors of typical "office paper" that do not meet the white ledger specifications. Again this grade must be free of treated, coated, padded or heavily printed stock.

*Special note: Papers again can be broken down into several different classifications or grades depending on the end-user specifications. The categories above reflect the most easily identified paper distinctions which are most widely accepted in the recycled paper industry.

Storage: Storage of CPO and ledger papers requires containers at printing stations as well as individual work stations. Several different types of containers are manufactured for this purpose. Interim, higher volume storage is sometimes required. Wheeled canvas or plastic hoppers are often used. Some programs use conventional outdoor metal dumpsters, locked to prevent contamination. Other programs use the same boxes in which the CPO and ledger are shipped for short term storage before removal. Like newsprint, moisture is a contaminant and must be controlled.

Processing: All high grades are received by the mills in bales shipped directly by packers/processors. Contaminants or other grades of paper are sorted out at the source or at processing facilities before baling. Hand picking from conveyors or sort tables is a common technique for separation of grades and

removing contaminants. Processing can include shredding or pulverizing to protect confidential documents.

Marketing: High-grade papers receive substantial prices on the market due to the long fibers in the paper which make the material competitive with virgin inputs in areas where recycled supply is dependable. Markets are also expanding with the increasing push for recycled products--especially recycled office papers.

High-grade papers are used as inputs for the manufacturing of other printing papers, various boxboard (eg: "white" cardboard boxes) and tissue products. Many of the paper markets impose strict guidelines on quality control for their specified grades and it is not uncommon for loads to be rejected. Paper contaminants include: other/unspecified grades of paper (ie. colored bond mixed in with white bond, including the lower grades such as glossy finished paper), excessive colored ink cover (30%+), windowed envelopes, adhesive labels, paper clips, and rubber bands. Contamination is relative to the specifications defined by the market. If a load if highly contaminated, it will usually be down-graded (seller receives lower price) or rejected. Potential large volume end users in the Michigan area include the following:

Michigan Paperboard Corporation of Battle Creek, MI produces paperboard and consumes approximately 10,000 tons of high grade paper each year.

Waldorf Simplex Products Group of Battle Creek, MI produces paperboard and consumes approximately 15,000 tons of high-grade paper each year.

Port Huron Paper Co. of Detroit, MI produces tissue and consumes approximately 15,000 tons of high-grade paper (a significant percentage from plant cuttings) each year.

Georgia Pacific Corporation of Kalamazoo, MI produces papers and consumes approximately 13,000 tons of high-grade paper each year.

James River Corporation of Kalamazoo, MI produces boxboard and consumes approximately 12,000 tons of high-grade paper each year.

White Pigeon Paper Co. of White Pigeon, MI produces boxboard and consumes approximately 9,000 tons of high-grade paper each year.

Low-Grade Papers: "File Stock" and Mixed Paper

Low-grade paper consumption, domestic and export, comprised 12 percent or 2.9 million tons of the 24 million tons of waste paper recovered last year in the U.S.. Also referred to as "mixed paper", lower paper grades usually allow coated or glossy papers such as advertising circulars, magazines, etc.. Certain

lower grades such as Fort Howard Paper's "file stock" are actually collected from the same source as the higher-grade papers, but need not be separated as extensively and can include manila folders, rubber bands, paper clips, and more.

Collection, Storage and Processing: The more "tolerant" a grade is--able to accept a wider variety of papers and certain level of other contaminants--the less source separation that will be necessary by the generator. Thus, mixed or file stock grades would require only a single collection bin, for example, rather than two or more for different high grades.

"File stock" is a grade defined as the assortment of papers typically found in office files. These office files will include a certain amount of paper clips and tape, and will have various paper types accumulated within them, including the file folders themselves. This grade is somewhat tolerant of contaminants, but should primarily be composed of the white and colored ledger/bond papers. Specifications from the buyer or market will indicate the allowable contaminants by rough or sometimes strict percentage.

Mixed paper typically includes those papers in the "File stock" category and would allow for more contamination by windowed envelopes, adhesive labels, occasional newspapers and glossy printed papers. This is next to the lowest of grades for which markets have been established, the lowest grades being all glossy print (ie. magazines). Mixed paper collection would allow for virtually no source separation, however it sometimes costs more in the shipping of this material to its buyer than the material is actually worth.

Storage and initial processing are similar for the low grades of paper as for the high-grades.

Marketing: Tissue and paperboard (grey "cardboard") are commonly made from the lower grades of paper, as well as products such as gypsum wall board and other construction materials. Potential large volume end users in the Great Lakes area include the following:

Fort Howard Paper Company in Green Bay, Wisconsin manufactures 100 percent recycled paper products such as paper toweling from lower paper grades. This paper company has 50 different grades in their specification guidelines, with one grade being exclusively "windowed envelopes." Their "file stock" grade, as described earlier, was worth $60.00/ton, with some variation of grade and price depending on contamination level. The company has two other mills in the country also using these same grades.

FSC Paper, of Alsip, Illinois will soon be opening a tissue mill similar to the Fort Howard operation. During plant startup, expected during mid 1989,

higher grades will be used to debug the system. Lower grades will then be phased in until they become the dominant plant input.

Mead Corporation of Otsego MI produces combination paperboard and consumes approximately 28,000 tons of mixed paper each year.

Another prospective market for both "file stock" and "mixed paper" is a gypsum wallboard producer, Domtar, with plants in Buffalo, New York and Toronto, Canada.

METALS

In 1988, the United States will have consumed approximately 80 million tons of scrap steel and another 2 million tons of scrap aluminum. Scrap is received from a number of sources, including the scrap auto industry, manufacturing plants and, in Michigan, the bottlers handling deposit beverage containers. A small percentage of the recovered material comes from the municipal solid waste stream in the form of steel cans, "white goods," scrap iron, and other miscellaneous metal products.

Scrap metal dealers and processors, located throughout southeastern Michigan, and concentrated heavily in the Detroit area, process millions of tons of scrap each year. A limited number, like Allen & Sons, Inc. of Pontiac, are located within the Oakland County boundaries. These processors then ship to any of over 75 blast furnaces, steel mills, and steel or iron foundries. The export market is also a significant part of the local scrap metal industry with 16 million tons shipped to Europe and Asia from the Port of Detroit in 1985.

Steel Cans

Steel cans are generated in both the commercial and residential waste streams. While the value of recycled steel is quite high, steel cans tend to pose a problem because most are coated with tin. Where possible, cans may be de-tinned and both the steel and tin recycled. The high value tin is sold to chemical manufacturers and the steel used for low-strength iron or in the process of making low-grade copper ore.

Markets for recycled tin cans such as those used for packaging food for households and food preparation industry are already well established. A major buyer in this region is the AMG Resources plant (formerly Vulcan Materials) in Gary, Indiana, which operates a modern de-tinning facility that is capable of receiving and processing 12,000 tons per year of tinplate. At the plant, tinplate is shredded and tin is removed using an electrolytic bath. The extracted tin (a scarce resource) is then used in chemical manufacturing. The de-tinned steel is sold as a number 1 bundle to steel mills. The mill is capable

of handling as much tin can material as sellers are able to supply. The firm has just announced plans to build a similar plant in New Jersey. Steel mills also have been recently taking steps to include steel can scrap as an accepted material at their facilities.

Tin cans are a bulky material and a significant amount of preparation and processing is required before shipping. Typically this involves either flattening, shredding or baling. In addition, loads must be free from food wastes and paper wrappings. Generators are often required to rinse the cans after use and remove any paper labels.

White Goods

Appliances, called "white goods" because they are often coated with enamel, usually contain a significant percentage of steel. According to the State Department of Natural Resources, an estimated 5-10% of all white goods are currently recovered in the State of Michigan, with unrecovered white goods comprising 2% of the municipal waste stream. They can be shredded in auto shredders for recycling, or taken to a reuse facility to be repaired and redistributed.

As with junk automobiles, white goods contain a wide variety of other non-metallic materials. While scrap iron can usually be brokered to mills with limited processing, both automobiles and white goods require initial processing that typically includes shredding and magnetic separation of the metal from the remaining "auto fluff" that is made up of residue plastic, textiles, insulation, and wiring. For appliances this process has the added benefit of breaking away the enamel finish from the appliance skin. That enamel is a high sulfur-producing agent for the steel mills, which are already under strong regulatory pressure to limit sulfur discharges during the production process. After shredding, the ferrous metal is brokered as a number 1 steel bundle.

Scrap metal users equipped with shredders (automobile or other) are the only practical brokers/processors for white goods. White goods compete directly with automobiles for the scrap metal buyer's dollar. With the abundance of junk automobiles available, white goods take a back seat, and the price offered reflects this position. Processors with auto shredding capabilities in the Detroit area include Allen & Son, Inc. in Pontiac, Huron Valley Steel in Taylor, and two Detroit firms, Auto Shred and Ferrous Processing and Trading. All have the capability to shred white goods and are large volume processors (40,000 to 60,000 tons/year shredding capacity), which insures a long-term market for the material. SOCIA already has a contract with Huron Valley Steel for ferrous scrap recycling, including white goods, and the City of Pontiac is working with Allen & Sons, Inc..

Two recent developments have created an additional barrier to white goods recycling. Appliances created before the mid 70's often used PCB's, a hazardous material, in their capacitors. Some scrap metal processors on the east coast have required that these be removed before recycling. The second concern is the refrigerant, freon, present in all air conditioners and refrigerators. This substance is known to contribute to the ozone depletion problem and is emitted into the atmosphere in significant quantities when white goods are shredded. Both of these problems may lead to further pre-treatment of white goods for removal of capacitors and refrigerant.

Scrap Iron

Next to white goods, ferrous metal objects make up the most significant portion of the metal in the waste stream. Iron castings, structural steel, forgings, and mixed sheet steel are disposed of as building materials, autoparts, machine parts, or miscellaneous household and business discards.

Castings originate mostly as sinks, bathtub and autoparts. Structural steel is mostly from buildings. Forgings may come from auto or machine parts. Mixed sheet includes auto parts, swing sets, office furniture, steel siding, and bicycles. Prices range from $30-35/ton for cast iron, $20-25/ton for sheet, and somewhere between this range for forgings and structural steel. Electric motors sell for $10/ton. Most buyers will accept structural steel and forgings mixed with the sheet.

This ferrous scrap can usually be brokered to mills with limited processing. Shredding with white goods is also an option, one that gives a lower price for the ferrous scrap but improves the density and quality of a white goods load. This last option, combining ferrous metal collection and storage with the white goods, provides the simplest method for including ferrous metal in a material recovery program.

Non-Ferrous or High-Grade Metals

Aluminum, copper, brass, bronze and other specialty metals make up the remainder of the scrap metal waste stream. High grading of metals frequently accompanies any ferrous metal recovery program. High grading practices typically involve removal of aluminum, copper, brass and other specialty metals from the metal fraction of the waste stream. While volumes are low, markets for these materials are strong and prices high. All scrap dealers will accept all materials that meet specifications. Specifications usually allow a minimal amount of contamination by other metals or materials.

Aluminum: The largest volume non-ferrous metal is aluminum. Due to the deposit law, aluminum comprises a relatively small amount of the waste stream, about 0.4%. Aluminum can still be recovered in the form of storm

doors and windows, siding, lawnmowers, lawn furniture and in many other discards. Its value ranges from five cents per pound and up (from pieces with steel rivets and screws to clean extrusions). Between these two grades are castings, tubing, sheet and foil. Prices vary with market conditions and levels of contamination. Mixed aluminum is usually sold at the price of the least valuable grade present. Minimal sorting can easily double the sale price of a quantity of aluminum.

Other Non-Ferrous Metals: High grading of metals frequently accompanies any ferrous metal recovery program. High grading practices typically involve removal of aluminum, copper, brass and other specialty metals from the metal fraction of the waste stream. While the largest volume non-ferrous metal is aluminum--the "red" and "white" metals are a lucrative material recovery opportunity. While the volumes entering the landfill are not great, the value of the materials may justify a collection container and hand picker at any material recovery facility.

Copper, brass and other red metals are the most valuable materials commonly found in the waste stream. Most copper and brass in the waste stream come from plumbing, wiring, electric motors and remodeling. Copper prices vary with the economy and demand, but usually are greater than thirty cents per pound. Bronze and brass prices, though often of lesser value than copper, usually follow closely.

White metals include zinc, magnesium and aluminum alloys. These are most commonly found in castings from toys, autos, appliances, furniture, plumbing fixtures and office machines. The various alloys are not easily identified or separated. Further, most pieces entering the waste stream are usually attached to other materials. Recovery of white metals would require experimentation. Buyers will not be able to offer a price until they see the actual mixture collected. A quantity of mixed material would need to be collected and offered to various potential buyers. If a suitable buyer can be found, then an ongoing collection of white metals could be established.

OTHER PACKAGING MATERIALS

Glass and plastic are the two remaining packaging materials that are recyclable and found in significant quantities in the waste stream. While glass has a long standing record in recycling programs, plastics represent a new--but rapidly growing--recycling opportunity.

Like aluminum, the Michigan bottle deposit law removes much of the carbonated beverage glass and PET plastic containers from municipal solid waste. Unlike, aluminum, both glass and plastic are still used extensively in packaging other food and beverage products and are still present in significant quantities in the waste stream.

Glass

Container glass is 100 percent recyclable. Glass is generated as beverage and food container waste from households as well as commercial establishments--largely in the food service industry.

Most recycled container glass is reused to make new glass containers. Market specifications require that glass be separated by color (clear, green, brown), and hand picking is the most economical method for doing so. To date, mechanical color separation of glass has not produced a product that will meet the industries' specifications. Unlike metal containers, labels on glass containers do not need be removed at the source. The only other requirement is that excessive food residue be removed from the containers.

Crushing of glass usually is necessary to improve storage and transportation and to meet plant specifications. Glass crushing systems reduce glass volumes by a factor of four to five. The end product is called glass cullet. Color mixing of cullet limits its marketability. In fact, midwestern glass markets are only able to handle color-sorted glass cullet (only recently has mixing of green and brown glass been allowed by one Michigan-based processor). For these reason, recycling programs typically have specific requirements that all glass be color-separated at the source--or they provide for a processing line where glass can be color-sorted by hand from commingled recyclables.

Markets are already well established as the Great Lakes region has a large number of glass container manufacturers--all with receiving capabilities for glass cullet. Michigan glass recyclers most frequently ship to one of three Michigan based markets, including Owens-Illinois Glass in Charlotte, Mid-Way Cullet in Dearborn and the FEAT Foundation in Flint. The latter two are processor/brokers who further process the glass into a furnace-ready cullet and ship to any of 20 Great Lakes area glass container manufacturers.

Specifications vary for different end users of furnace ready cullet and for different manufacturers of the same end products. Certain glass container companies require more stringent purity levels, although a standardized set of cullet specifications has been established by the American Society for Testing and Materials. The use of glass cullet by the industry has been steadily increasing for many years--leading to good price stability.

Other potential uses for glass cullet include fiberglass, glass bead and glassphalt. Glassphalt (asphalt paving made with glass cullet) has generally performed well in many cases, but is more expensive to produce. Some municipalities with their own asphalt making facilities (New York City) are seriously investigating the use of a mixed glass cullet in road construction.

Plastics

The infrastructure for recovery and reuse of plastics is in early stages of development, especially when compared to waste paper or glass recycling--yet strong growth in plastics recovery is expected in both the short and long term due primarily to the aggressive development of plastic recycling markets by industry

Four of the more prominent industry trade associations created in recent years include the Plastics Recycling Foundation, the National Association for Plastic Container Recovery, the Council on Plastics and Packaging in the Environment, and the Council for Solid Waste Solutions. Each is heavily sponsored by major chemical companies and have had the combined effect of pushing more and more recycling programs to include recovery of plastics in their material recovery strategy.

Despite this effort, in 1987 less than 2 percent of the plastics in the solid waste stream was recycled. Currently most plastic that is recycled in Michigan is limited to cuttings from manufacturing plants. A few community recycling centers in Michigan are collecting and marketing post-consumer plastics, although that is limited primarily to plastic milk jugs and detergent bottles (high density polyethylene or HDPE). The Processed Plastics facility in Ionia, MI, owned by Summit Steel, now accepts a broader range of containers made from HDPE, yet recycling centers are generally holding back on expansion of their collection programs for plastics at this stage.

Two of the most significant barriers to plastic recovery are: 1) There are several types of plastic--some that can be commingled and others that must be segregated to permit recovery, and 2) Plastic--a low density material--requires shredding and compaction to justify shipping long distances. Even then, transportation costs per ton are significant.

Industry efforts are rapidly addressing these barriers. It is expected that markets for the following types of plastic resin may be viable:

High Density Polyethylene or HDPE: HDPE resins are used to make hard plastic containers such as milk and juice jugs, motor oil containers, liquid detergent, bleach and cosmetic bottles, ice cream tubs, trash cans, drums, pallets and a wide variety of other container applications. About 50 percent of all plastic containers are made from HDPE and about 12 percent of all HDPE containers are milk jugs.

The Society of Plastics Industry indicates that estimates of HDPE recovery in 1987 across the U.S. range from 21,500 to 41,000 tons. Demand for HDPE scrap is expected to increase as firms develop the capabilities to clean and convert

the scrap into usable feedstock for the plastics industry. One firm, based in Madison Heights, Polymer Plastics, Inc., has already developed this capability. Michigan plastics firms, which numbered 1,000 in 1984 and shipped $4.1 billion dollars worth of material, are expected to be major consumers of this regrind. The automobile and construction industries are expected to be major consumers of the end products. Michigan based Dow Chemical Corporation has teamed up with Domtar, Inc. in a new joint venture to recycle HDPE plastic bottles.

HDPE scrap is being used in making synthetic wood lumber for highway reflector markers, parking lot bumpers, fence posts and garden furniture, as well as pipe, drainage tile, pails, drums, traffic barrier cones, golf bag liners, trash cans and signs.

HDPE scrap is typically ground into pieces about one-quarter inch square and transported in heavy corrugated boxes called gaylords. A typical gaylord is 4' x 4' x 3' and will carry about 700 pounds of plastic scrap when filled . Currently, the price for scrap HDPE regrind is less than half the price of virgin plastic feedstock, a fact that is expected to further develop the HDPE market.

Low Density Polyethylene or LDPE: LDPE resins are used to make disposable consumer packaging products such as trash bags, grocery sacks, plastic sheeeting, and a variety of food containers. About 70 percent of all packaging films are LDPE and about 25 percent of all LDPE film is trash bag waste. LDPE is also used as a shrink and stretch wrap in many shipping and manufacturing applications.

The primary end use of recycled LDPE is for additional LDPE plastic film and other low-grade products such as flower pots, plastic mats and drainage pipes. European recycling of LDPE films is well ahead of the U.S. pace, with a manufacturer in Italy reporting that a third of all films are made from recycled LDPE.

While HDPE scrap is most frequently ground for end users, LDPE films are baled at a recycling facility. LDPE films can be included in the materials flow of any automatic baling line and shipped directly to end user markets.

Polyethylene Terephthalate or PET: Because of the Michigan bottle deposit law, recovery of PET resin containers (one and two liter pop bottles) is reasonably well developed and is not further discussed in this report.

COMPOSTABLE WASTE

Both residential and commercial waste includes a wide variety of organic material that is compostable. While composting systems can handle such

diverse materials as paper products, food industry waste, and sewage sludge, this discussion shall be limited to food, yard and landscape waste found in the municipal waste stream. It is useful to consider these types of waste as "soft" yard waste and "hard" yard waste--primarily because of the different processing that is required and the different end products that can be produced.

Soft Yard Waste

Soft yard waste is made up of grass clippings, leaves, garden waste and small prunings. All of these materials can be directly composted with little if any preliminary shredding. Contaminants must be kept out of the yard waste. Plastic bags are typically the main concern, although many other unwanted materials are found. While biodegradable plastic and paper bags are available, the majority of bags do not degrade and must be removed either by hand or mechanically. Bulk collection of yard waste with no bags has been a successful method of avoiding the bag contamination problem in some programs.

A compost processing operation is required to decompose the soft yard waste. Material is windrowed and turned periodically. Some material may be shredded before windrowing to speed up the process. Material may be delivered in a wide variety of vehicles from rear garbage packers to transfer station vehicles to pickup trucks.

Potential end users will have different requirements for final end-product quality. As a landfill cover, the compost can be a very coarse unscreened material with a high percentage of other materials present (wood chunks, metal, bits of plastic bags, etc.). Other end users such as a Parks Department or the general public may require a screened compost with a smaller, finer texture and no observable contamination by other materials. Golf course grounds keepers would require an even finer end product, mixed with other materials such as sand and peat. All material must go through the basic decomposition process first. Screening, mixing and other processing can be completed afterwards as required.

Unlike the markets for recovered materials already described, markets for the end product of soft yard waste recovery are generally local and municipalities may become the primary users. These end products are basically various grades of soil amendment such as leaf humus, mulch and compost. These soil amendments have a number of applications that include:

- Land reclamation of landfills, gravel pits and road construction areas
- Erosion control for slopes, drains and retention basins
- Top dressing for parkland, athletic fields, golf courses and building grounds

- Soil builder for tree farms, greenhouses, agriculture and community gardens
- Soil builder for residential gardening and landscape projects

A review of successful yard waste composting operations throughout the country indicates that users of these soil amendments are usually residents, municipal departments, public agencies and commercial buildings. Use as a landfill or highway right-of-way cover material is very common. In general, uses for the material are easily found once it is made available.

Hard Yard Waste (ie: Brush and Small Diameter Wood Waste)

Brush and small diameter wood waste also can be processed into usable end products. As with soft yard waste, the markets for the end products are generally local with many of the same markets as identified in the previous section. Shredded brush and wood can be used as ground cover, mulch, bulking agent when mixed with other soils, landscaping material, and a useful material for landfill operations. As an example of this last application, nearby landfills use shredded wood in the spring, fall and winter as a cover material over the temporary traffic lanes at the landfill face--eliminating rutting problems, stuck vehicles and hauler complaints.

Shredded wood has an additional market as a boiler fuel, with a number of wood-fired boilers already burning selected grades of shredded wood--the majority from virgin timber stands and a small percentage from scrap post-consumer wood.

Processing requires a brush stockpiling area capable of receiving loads from generators of brush and wood waste as well as municipal yard waste pickup programs. Portable high volume yard waste grinding equipment is then used to reduce the size of the material. Depending on the particular equipment chosen, this equipment can handle brush, tree limbs ranging from 6 to 12 inches in diameter, pallets, wood furniture, dimensional lumber and similar materials.

Stumps, large diameter limbs and lumber, white goods, metal, and other materials are all considered contaminants, and operational procedures must be established to guarantee that these materials are removed before shredding.

Food Waste

Both residential and commercial generators of food waste contribute a significant volume of compostable food waste to the municipal waste stream. This "wet waste" stream was traditionally classified as "garbage" in most municipal ordinances, with other wastes classified as "rubbish". Many rural

communities had wet waste garbage service while letting citizens use burn barrels and back yard dumps for rubbish. Sanitary issues and public health concerns caused this special treatment.

Food waste can be composted, just as soft yard waste is--only with more sophisticated equipment and management practices. The nature of this wet waste stream places much greater constraints on containerization, collection, and processing. Depending on the type of processing system, definitions of acceptable material can vary considerably. A highly sophisticated MSW composting system using "in-vessel" technology would place few restrictions on the type of food waste allowed. A low technology windrow system would probably restrict certain high fat and meat waste products. An example of this latter system is already being pilot tested in one northern Michigan community.

Wet waste from certain food processing industries may be prime candidates for food waste composting programs. Vegetable packing plants, fruit processing facilities and related operations are able to collect large volumes of compostable material and deliver them to compost processing centers.

The end products of a compost operation, soil amendments, are still the same regardless of whether food waste was an input. The processing requirements and operational procedures will certainly vary. Many of the same end-use applications for soil amendments from soft and hard yard waste composting will apply to a compost system that has food waste as a feed stock.

SPECIAL WASTES

A number of other waste materials deserve consideration in a materials recovery strategy. Several of these items pose environmental hazards if discarded improperly; others contain valuable materials which should be recovered and sold to end-user markets. Some of these materials are batteries, tires, textiles, household hazardous wastes, concrete and asphalt,

Batteries

There are two categories of batteries--automobile and household. They are handled and processed separately. Both are undesirable in the waste stream because they contain heavy metals which can create serious problems in the environment after landfilling or incineration.

Markets for discarded automobile batteries have been developed in Oakland County. Several scrap metal dealers buy batteries for one dollar each, then sell them to be processed and made into new batteries. Auto batteries may also be collected at recycling drop-off stations and in curbside collection programs.

Recovering of household batteries is not as easy nor as developed. Since these batteries are small and are marketed as "disposable", they usually end up in the trash can and are not recycled. Mercury from the batteries is associated with numerous health problems and genetic disorders in humans and animals; cadmium is linked to cancers and other organ diseases.

Battery sales (for flashlights, tape recorders, cameras, watches, toys, smoke detectors, radios, calculators, and hearing aids) in the United States are a billion-dollar business and growing. A 1986 report by Duracell stated that the average family has about 10 devices for which batteries are needed and purchases about 32 batteries per year.

Several communities around the country have started battery collection programs, recycling materials for which there are recovery processes and markets, and properly disposing of the remaining batteries as hazardous waste. In New York City, the Environmental Action Coalition (EAC) started battery collection through both its apartment house recycling program, using small boxes for residents, and in retail stores and doctors' offices, using brightly marked cardboard boxes where customers can deposit used batteries. The full boxes are sent in special mailers to EAC, where they are separated by type and sent to a refinery.

The New Hampshire/Vermont Solid Waste Project recovered over 10,000 pounds of household batteries from 26 communities in 1987, its first year of operation. Retail stores are provided with promotional flyers and a five-quart bucket with a battery recycling logo to be placed next to new battery displays. Consumers are encouraged to return used batteries to the buckets. Local volunteer organizations, such as the Girl Scouts, collect the buckets regularly, then separate and store them in 55-gallon drums until sufficient quantities have accumulated for shipment to markets or a hazardous waste handling facility.

A project in Springfield, Missouri, will provide retail stores with pre-addressed postage-paid self-mailer collection boxes that can be returned directly to a processor.

Tires

In past decades, used tires were discarded at the rate of one tire per person per year. This rate is probably decreasing to 0.8 tires per person per year due to the longer lasting steel belted radials used on many cars. This results in nearly 890,000 tires discarded in Oakland County last year.

The most common disposal option is to throw the tires onto a stockpile. These stockpiles, however, present two major health risks to individuals

living near the piles. Inextinguishable fires have started in several stockpiles around the nation, often lasting over a month. Foul black smoke generated by the fires can force neighbors from their homes until the fires burn out.

In addition, the water and warmth present in tire piles provide an ideal breeding ground for mosquitos. The seriousness of this problem has been limited by the fact that mosquitos which carry dangerous diseases are rarely present in Michigan. This may be changing as the Asian Tiger mosquito, believed to have entered the United States in tires, spreads its breeding ground north from Ohio into Michigan. The Tiger mosquito caries the La Crosse virus (a form of encephalitis) that has resulted in various disabilities for infants living near tire stockpiles.

Tires which are not stockpiled are usually hauled to the landfill or incinerator. Buried tires tend to "float" to the surface of the landfill, disrupting cover materials and making any future land use difficult. When tires are incinerated, air pollution and toxic ash can be emitted. To burn tires cleanly, sufficient heat and oxygen must be available to burn the large quantity of carbon black which is present. Scrubbers must remove acids formed from chlorine, sulphur, and heavy metals used to plate wire in the belting.

In California and in the Northeast, power plants have been built to be fueled exclusively by tires. Very large existing stockpiles of tires are necessary to justify these investments, since an adequate supply of tires must be available for the life of the plant.

Tire slitting for immediate burial at the landfill site is one alternative to stockpiling, landfilling, and incinerating. Slitting is labor intensive, but capital costs are relatively low. Tires can also be chipped for easy handling and storage (and reduced risk of fire and mosquito breeding), then landfilled or burned in boilers with suitable feeds and adequate scrubbers. Or, instead of being destroyed, the chips can be processed into crumb rubber to be used in future rubber and plastic products or to make high-durability asphalt pavements and coatings. These asphalt products may cost nearly four times the price of conventional asphalt, but exhibit nearly four times the life. Markets for these products have not been developed in the Midwest.

Textiles

Textile wastes are generated in households, retail stores, and businesses which produce textile products. There are three main uses for these items: 1) conversion to rags, 2) conversion to filler products such as insulation or padding for furniture and automobiles, and 3) shipment overseas to be converted to rags or other textile products.

Overseas shipment, the third use, constitutes the largest market for used textiles, which are easily baled for transport.

A processing facility in Baltimore, Maryland receives donated clothing and rags from households and businesses, which are then sold to second-hand shops, individuals, or overseas markets.

Household Hazardous Wastes

Household hazardous wastes pose a great threat to groundwater contamination. The small and individual quantities of this waste belittle its hazard, but when multiplied hundreds and thousands of times, its potential to inflict damage on the environment is considerable.

Oakland County has not hosted a household hazardous waste (HHW) collection day since the early 1980's, when it provided two one-day collections funded through the United States Environmental Protection Agency. Because Oakland County had received earlier sponsorship of a HHW program, they have been ineligible for Clean Michigan Fund monies, under current rules. Local units of government, including Oakland County, have been unable or unwilling to sponsor their own programs. Liability and funding concerns have been dominant.

The Oakland County Health Department continues to receive requests from the public concerning safe disposal methods of dangerous chemicals, solvents, and pesticides. However, few responsible options exist. The best available alternative is the free disposal service offered by Chemical Analytics, in Romulus, Michigan. They accept small quantities of HHW from Oakland County residents at no charge to the public. Other options include waste exchange programs. Non-profit housing organizations, schools, and theater groups will accept unneeded paints, thinners, and the like.

Concrete, Dirt and Asphalt

In an area which is experiencing rapid growth, such as Oakland County, construction is often one of the largest sources of solid waste, producing or displacing concrete, dirt, and asphalt. In older communities demolition waste, broken concrete from roadways and sidewalks, and asphalt comprise much of the waste.

Masonry materials are detrimental to incineration and, because they do not decompose, should not occupy valuable landfill space. Traditionally, these materials have been used as "clean fill" to raise the grade of low sites. However, protection of wetlands and zoning has restricted this practice.

Areas of the country with limited stone and gravel supplies have recycled old roadways into new roadways for many years. In recent years, this practice has become common in this area, also. Old concrete is crushed and used to make new concrete or asphalt. Asphalt is ground or crushed to make new asphalt. While the new materials may have reduced weight capacity, they are adequate for driveways, shoulders, parking lots, walkways, and as a topcoat. Crushed asphalt and concrete are also used as base gravel under roadways. County and municipal governments can encourage these practices in roadway and sidewalk construction bid specifications.

Markets for concrete and asphalt exist in Oakland County. Concrete plants with crushers will often accept clean broken concrete from the public and businesses. Asphalt plants with crushers can accept clean broken asphalt and concrete. The following businesses accept these materials: Portable Ag (Commerce Township), Thompson McCully (Clarkston), and Asphalt Products Co. (Wixom).

Wood Waste

Large diameter logs, stumps and timber can be processed for end-use markets. Auctioning off collected timber and stumps is often successful with buyers trying to fill orders for firewood in area homes or shredding stumps as boiler fuel. Dow Chemical in Midland buys wood waste to fire its boiler.

Some municipalities will complete these value-added steps before auctioning off the material. Logs will be cut to stove length, split and stacked. Stumps will be sent through large forestry-scale stump-grinding equipment, size-reduced to boiler fuel specifications. Wood waste may be shredded at a material recovery facility or compost site.

TARGETED RECYCLED MATERIALS AND PROJECTED PRICES

Exhibit II.1 on the following page pulls together characteristics of key recyclable materials that are covered in the previous section. These characteristics include the existence of stable markets, the relative level of processing required, possible sources for processing capacity, and the requirements for processing.

The exhibit also provides additional information on the relative quantity of the material in the waste stream and a measure of the relative volume of materials needed to start a program.

These considerations are important to decisions on "point of entry" for beginning a program targeted at a specific material. Can a simple collection system be easily started or are more complex service arrangements and

equipment configurations required? Should this material be part of a start-up program or best brought on-line as a program add-on at a later date?

The final column of the exhibit (far right) summarizes these considerations with a simple ranking of materials--proposing optimum points of entry for each material in a staged recycling program. A phased implementation of these programs will bring first stage materials on-line initially, incorporating second and third stage materials at later dates.

This exhibit will serve as a base for program design in later stages of this analysis.

EXHIBIT II.1

PROPOSED STAGING OF TARGETED RECYCLED MATERIALS
OAKLAND COUNTY--MATERIAL RECOVERY STRATEGY

	RELATIVE QUANTITY IN WASTE STREAM	STABLE MARKETS AVAILABLE	RELATIVE LEVEL OF PROCESSING REQUIRED	PROCESSING AVAILABLE IN COUNTY	OTHER OPTIONS FOR MARKETING AVAILABLE	VOLUME NEEDED TO START PROGRAM	PROPOSED OPTIMUM POINT OF ENTRY
PAPER--LOW GRADES							
NEWSPRINT (ONP)	HIGH	YES	CLEAN & BALE	NO	NO	LOW	FIRST STAGE
CARDBOARD (OCC)	HIGH	YES	CLEAN & BALE	NO	NO	MEDIUM	FIRST STAGE
FILE STOCK	MEDIUM	YES	CLEAN & BALE	NO	HIGH GRADE	MEDIUM	FIRST STAGE
MIXED PAPER	HIGH	NEEDS WORK	BALE	NO	NO	MEDIUM	THIRD STAGE
PAPER--HIGH GRADES							
COMPUTER (CPO)	LOW	YES	SORT & BALE	YES	FILE STOCK	LOW	FIRST STAGE
WHITE LEDGER	LOW	YES	SORT & BALE	YES	FILE STOCK	LOW	AS FILE STOCK
COLORED LEDGER	LOW	YES	SORT & BALE	YES	FILE STOCK	LOW	AS FILE STOCK
METALS							
TIN CANS	MEDIUM	YES	CRUSH OR SHRED	YES	SCRAP FERROUS	MEDIUM	FIRST STAGE
WHITE GOODS	MEDIUM	NEEDS WORK	CLEAN & SHRED	YES	NO	MEDIUM	FIRST STAGE
OTHER SCRAP FERROUS	MEDIUM	YES	SHRED & BALE	YES	NO	MEDIUM	SECOND STAGE
ALUMINUM	LOW	YES	CLEAN & BALE	YES	NO	MEDIUM	FIRST STAGE
RED METALS	LOW	YES	SORT & BALE	YES	NO	MEDIUM	SECOND STAGE
WHITE METALS	LOW	NEEDS WORK	SORT & BALE	YES	NO	MEDIUM	THIRD STAGE
OTHER PACKAGING/CONTAINERS							
GLASS: COLOR SEPARATED	LOW	YES	SORT & CRUSH	NO	NO	MEDIUM	FIRST STAGE
GLASS: MIXED (ALL COLORS)	LOW	NO	CRUSH	NO	COLOR SEPARATED	HIGH	BROWN/GREEN ONLY
HDPE PLASTIC	MEDIUM	YES/DEVELOPING	SORT & GRIND	YES	NO	LOW	FIRST STAGE
LDPE PLASTIC	MEDIUM	YES/DEVELOPING	SORT & GRIND	NO	NO	MEDIUM	SECOND STAGE
PET PLASTIC	MEDIUM	YES/DEVELOPING	SORT & GRIND	YES	NO	MEDIUM	BOTTLE LAW ONLY
COMPOSTABLE MATERIALS							
SOFT YARD WASTE	MEDIUM	NEEDS WORK	WINDROW	NO	NO	MEDIUM	FIRST STAGE
HARD YARD WASTE	MEDIUM	NEEDS WORK	GRIND & WINDROW	YES	NO	MEDIUM	FIRST STAGE
FOOD WASTE	MEDIUM	UNDEVELOPED	VARIES	NO	NO	HIGH	THIRD STAGE
SPECIAL WASTES							
WOOD WASTE	MEDIUM	NEEDS WORK	SPLIT OR GRIND	YES	NO	MEDIUM	SECOND STAGE
BATTERIES	MEDIUM	NO	SORT & CONTAIN	NO	NO	LOW	SECOND STAGE
TIRES	MEDIUM	UNDEVELOPED	GRIND	NO	NO	MEDIUM	SECOND STAGE
USED OIL	MEDIUM	YES	CONTAIN	NO	NO	LOW	FIRST STAGE
HOUSEHOLD HAZARDOUS	MEDIUM	NEEDS WORK	SORT & CONTAIN	NO	NO	LOW	FIRST STAGE
CONCRETE/DIRT/ASPHALT	MEDIUM	YES	CLEAN & CRUSH	YES	NO	HIGH	FIRST STAGE

RESOURCE RECYCLING SYSTEMS,INC. 1988

The next exhibit (II.2) tracks historical price data for selected recycled materials that will be part of a material recovery program. Analysis of market trends, coupled with internal projections of recycling activity over the next decade, are then used to project a price scenario for that material. Prices in the projections reflect:

- Trade journal assessments of near term market development activity
- Application of east coast recycling market trends to midwestern markets during mid-term periods as recycling programs are brought on line temporarily pushing supply beyond current market capacity.
- Assessment of market development demand catching up to supply during long term time periods--moderating any excessive drop in market prices.
- An effort to conservatively predict price to allow for conservative assessments of program economics.
- An assumption that Oakland County material recovery strategies will rely, to the extent possible, on longer term contractual agreements for materials with wide fluctuations in pricing--thus preventing capture of excess high price revenues or excess losses during low price spot market conditions.

Assumptions in this exhibit will serve as a base for program design in later stages of this analysis.

EXHIBIT II.2

HISTORICAL AND PROJECTED PRICES FOR SELECTED RECOVERABLE MATERIALS
(All Prices In $/Ton)

MATERIAL	PRICE HISTORY (1983-88) Minimum	Maximum	Current	MARKET OUTLOOK	PRICE FORECAST FOR ANALYSIS Near-Term 1-2 Yrs	Mid-Term 3-5 Yrs	Long-Term 6+ Yrs
PAPER							
Newspaper (1)	$25	$60	$35	Significant fluctuations. May soon saturate	$30	$25	$30
Corrugated (1)	$25	$60	$35	Significant fluctuations. May soon saturate.	$30	$25	$30
File Stock (2)	$50	$65	$60	Stable market.	$60	$55	$55
CPO (1)	$95	$200	$190	Significant fluctuations. May soon weaken.	$180	$150	$150
White Ledger (1)	$60	$75	$70	Stable market.	$70	$70	$70
Mixed Paper (1)	$5	$20	$15	Significant fluctuations. May soon saturate,	$10	$5	$10
GLASS (3)				Stable market. May soon weaken.			
Clear	$30	$50	$50		$45	$45	$45
Brown	$15	$35	$25		$25	$25	$25
Green	$15	$35	$20		$20	$20	$20
METALS (4)							
Ferrous Scrap	$80	$135	$125	Significant fluctuations. Remain strong.	$100	$90	$90
Steel Cans	$50	$80	$75	Significant fluctuations. Remain strong.	$75	$70	$70
UBC Aluminum	$300	$2,100	$1,950	Steady growth. Slight weakening expected.	$2,000	$1,800	$1,500
PLASTICS (5)							
HDPE	$580	$980	$950	Market in steady upswing.	$1,000	$1,200	$900
LDPE	$600	$1,020	$1,000	Market in steady upswing.	$1,000	$1,200	$900

Notes:
(1) Official Board Markets. Discussions with major midwest mills.
(2) Fort Howard Paper Company.
(3) MNDR: Background Report to Recycling Feasibility Studies, Vol. 1.; Discussions with major Michigan glass companies.
(4) MNDR: Background Report to Recycling Feasibility Studies, Vol. 1.; American Metal Market.
(5) MNDR: Background Report to Recycling Feasibility Studies, Vol. 1.; Modern Plastics.

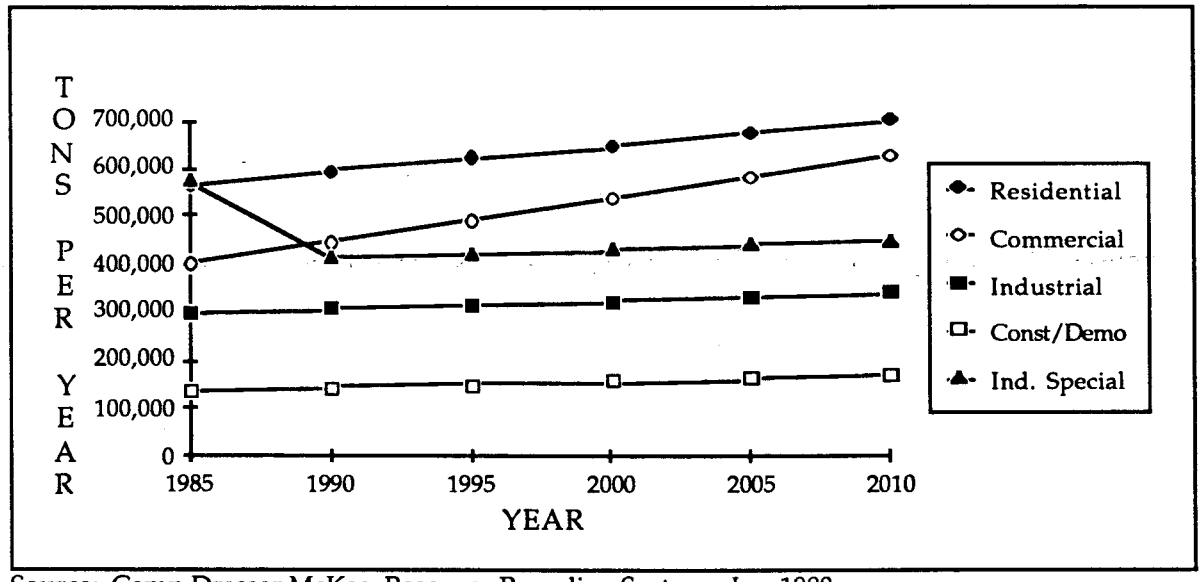
SECTION III

WASTE STREAM ASSESSMENT

Developing a material recovery strategy for Oakland County requires accurate estimates of current and future waste volumes and composition. Volume estimates of the total Oakland County waste stream can be shown as follows:

EXHIBIT III.1

ESTIMATED WASTE GENERATED IN OAKLAND COUNTY ALL SOURCES, 1985 - 2010



Source: Camp Dresser McKee, Resource Recycling Systems, Inc. 1988

In 1985, 1,262,300 tons of municipal solid waste, nearly 3,500 tons per day, was generated by the County's residential, commercial, and industrial sectors. This municipal waste constituted 64% of the entire County solid waste stream. By 2010, residential, commercial, and industrial solid waste is expected to grow by 32% to 1,662,000 tons per year, over 4,500 tons per day, and will constitute 73% of the entire County solid waste stream.

The recycling systems developed and recommended in this report focus on recovering materials from the residential and commercial sectors. These sectors currently generate 961,300 tons per year, or 2,630 tons per day, constituting 75% of the County's municipal solid waste and nearly 50% of the total waste stream. By 2010, the residential and commercial sectors will generate an estimated 1,327,000 tons per year, or 3,635 tons per day, constituting 80% of the municipal solid waste, and over 58% of the total solid waste stream.

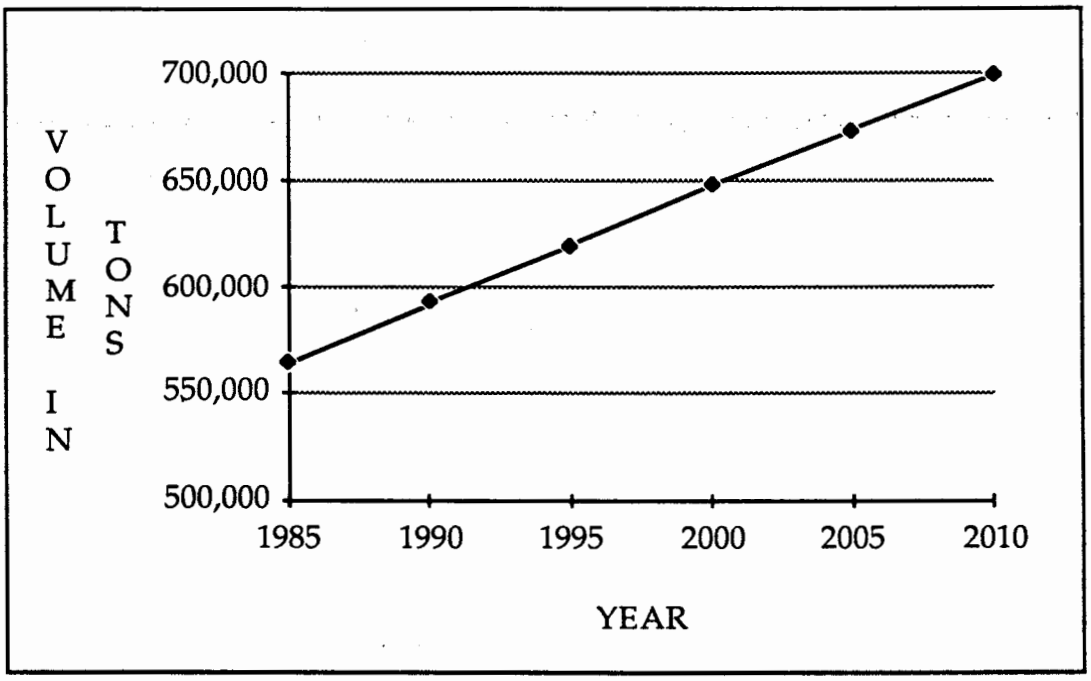
The recommended recycling collection and processing systems are targeted to reduce disposal of residential and commercial solid waste by 50%. If achieved, these systems will reduce municipal solid waste by 35-45%, and will reduce the County's total waste stream by 25-35%.

RESIDENTIAL WASTE STREAM VOLUME AND COMPOSITION

It is estimated that each person in Oakland County generates an average of 2.9 pounds of waste per day, or 0.53 tons per year. Using population projections provided by SEMCOG, it is estimated that residential waste generation will grow from 561,200 tons in 1985 to 620,000 tons in 1995, and 700,000 tons in 2010.

EXHIBIT III.2

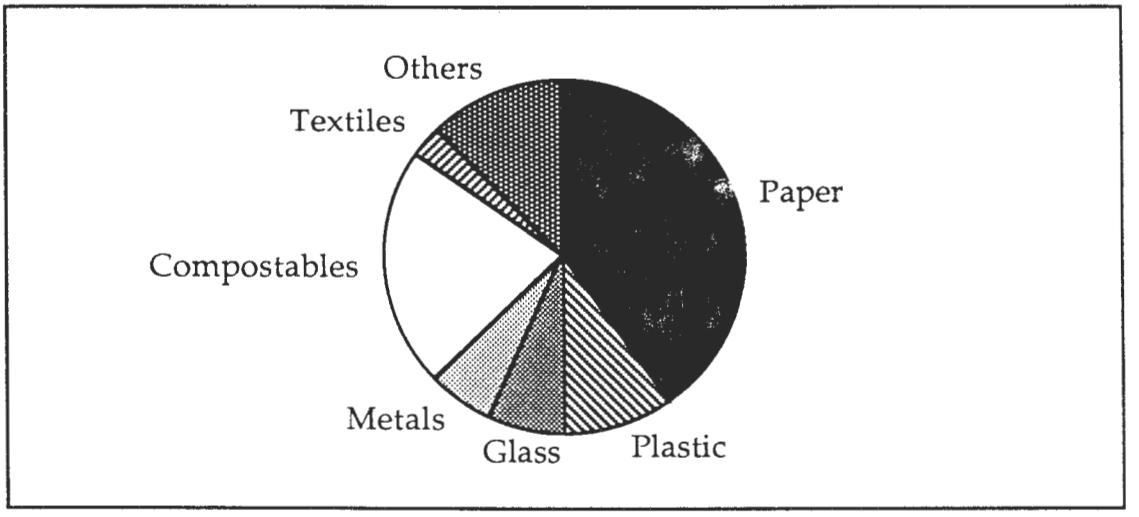
ESTIMATED ANNUAL VOLUME OF RESIDENTIAL WASTE IN OAKLAND COUNTY, MICHIGAN



Waste composition estimates for Oakland County households are shown in Exhibits III.3 and III.4. They are based upon a composite of waste stream assessments that have been completed in Oakland County and throughout the state, and make subtle distinctions between urban/suburban and rural households. Recyclable and compostable materials clearly comprise a significant portion of the residential waste stream. Nearly all paper products (roughly 40% by weight of the waste stream), plastic (10%), glass (7%) and metals (6%) are potentially recyclable with current technology. Food, yard, and wood waste (22%) are compostable. Textiles (3%) and other materials may also be recovered to varying degrees.

EXHIBIT III.3

RELATIVE COMPOSITION OF RESIDENTIAL WASTE STREAM
IN OAKLAND COUNTY, MICHIGAN



Most of the composition differences between waste generated by urban/suburban and rural residents are quite small. The relative fractions of compostable materials (food, yard, and wood waste), however, does vary considerably.

EXHIBIT III.4

PERCENT COMPOSITION OF MATERIALS FOR
URBAN, SUBURBAN, AND RURAL RESIDENTIAL GENERATORS
IN OAKLAND COUNTY, MICHIGAN

MATERIALS	URBAN AND SUBURBAN GENERATORS	RURAL GENERATORS
Paper		
Newsprint	12%	10%
Corrugated	5%	5%
Office		
Other	25%	25%
Total Paper	42%	40%
Other Organics		
Plastics	10%	12%
Textiles	4%	3%
Wood	2%	4%

MATERIALS	URBAN AND SUBURBAN GENERATORS	RURAL GENERATORS
Food Wastes	4%	10%
Yard Wastes	20%	4%
Misc. Organics	4%	10%
Total Other Organics	44%	43%
Non-Organics		
Glass	5%	8%
Metals	5%	7%
Other	4%	2%
Total Non-Organics	14%	17%
TOTALS	100%	100%

Source: Resource Recycling, Inc. 1988

COMMERCIAL WASTE STREAM VOLUME AND COMPOSITION

The commercial waste stream consists of all refuse generated by office buildings, restaurants, banks, retail stores, wholesale warehouses, and other non-manufacturing businesses, as well as governmental units, universities, hospitals, and other non-profit organizations. This sector generated over 400,000 tons in 1985, 32% of the County's municipal waste stream and 20% of the County's entire waste stream.

Estimating the volume and composition of materials which might be recovered from the Oakland County commercial waste stream is difficult because of a lack of data which can be generalized across the commercial sector. Approximately three-quarters of the waste from office buildings, banks, insurance firms, corporate headquarters, universities, and similar types of establishments is made up of paper. As much as half of the waste from wholesale and retail firms is cardboard. Restaurants, bars, and other eating establishments discard significant quantities of glass and metal containers. The waste stream compositions of repair shops, hotels, athletic gyms, and other service firms also contain paper, metals, and glass, though concentrations of these materials vary considerably. In short, there are many types of firms within the commercial sector, and each type generates different waste volumes and compositions. The commercial waste volume and composition of a local economy dominated by banks will vary tremendously from that dominated by restaurants.

The 1984 SEMCOG Small Area Forecast, which specifies the number of employees in particular types of businesses, was used to account for these

nuances. Based upon data provided in the forecast, employment estimates were prepared for three types of commercial establishments:

Financial, Insurance, and Real Estate (F.I.R.E.) and Public Administration. This category includes banks, credit unions, savings and loans, brokerages, insurance carriers and agents, real estate firms, governmental offices, schools, and similar types of "office building" establishments. In these types of establishments, different grades of paper comprise approximately three-quarters of the waste generated.

Wholesale and Retail. This group includes all employees of firms involved in the wholesale or retail trade, including all businesses selling goods to retailers and to the general public. Cardboard constitutes roughly half of the waste stream from these businesses.

Services. This category includes all private and public organizations involved in the business, repair, personnel, restaurants, bars, hotels, entertainment, recreational, and professional services. It is estimated that slightly more than 50% of the waste stream from these establishments is comprised of paper, nearly 20% of glass and metals, and nearly 30% of plastics and compostables.

Waste of businesses in these categories, which generate 90% of the total commercial waste, were targeted for analysis because their waste compositions differ significantly and contain large volumes of easily recoverable materials. The specific composition estimates used for these three targeted commercial categories are shown in Exhibit III.5.

EXHIBIT III.5

PERCENT COMPOSITION OF MATERIALS FOR TARGETED COMMERCIAL GENERATORS IN OAKLAND COUNTY, MICHIGAN

MATERIALS	F.I.R.E. & PUBLIC ADMINISTRATION	WHOLESALE AND RETAIL	SERVICES
Paper			
Newsprint	20%	4%	10%
Corrugated	15%	50%	30%
Office	20%	7%	8%
Other	20%	7%	7%
Total Paper	75%	68%	55%
Other Organics			
Plastics	3%	7%	5%

MATERIALS	F.I.R.E. & PUBLIC ADMINISTRATION	WHOLESALE AND RETAIL	SERVICES
Textiles	1%	3%	3%
Wood	1%	2%	2%
Food Wastes	3%	3%	8%
Yard Wastes	1%	2%	4%
Misc. Organics	5%	4%	5%
Total Other Organics	14%	21%	27%
Non-Organics			
Glass	5%	2%	6%
Metals	4%	5%	7%
Other	2%	4%	5%
Total Non-Organics	11%	11%	18%
TOTALS	100%	100%	100%

Source: Resource Recycling Systems, Inc. 1988

As shown in Exhibit III.5, most of the waste from these organizations is potentially recyclable. Paper products (55 - 75%), plastic (3-7%), glass (2-6%) and metals (4-7%) are all largely recyclable with current technology. Food, yard, and wood waste (5-14%) are completely compostable. Textiles (3%) and other organic and inorganic materials are reusable or recyclable to varying degrees.

The average commercial waste volume estimate proposed by Camp Dresser McKee is 5.75 pounds per employee per day, or 1.05 tons per employee per year. This estimate is consistent with other commercial volume estimates available and is applied to all employees in all three commercial types.

Complete volume and composition estimates for Oakland County may be determined by combining the employment information provided by the SEMCOG Forecast, the composition estimates generated by RRS, and the volume estimates proposed by CDM.

Using the information and assumptions outlined above, 1985 volume and composition estimates for Oakland County for the residential and targeted commercial waste streams can be calculated and are presented in Exhibit III.6.

EXHIBIT III.6

1985 WASTE VOLUME AND COMPOSITION OF TARGETED GENERATORS (IN TONS) IN OAKLAND COUNTY, MICHIGAN

	Residential	F.I.R.E.*	W. & R.	Services	Total
Paper					
Newspaper	65,122	10,828	4,866	18,742	99,558
Cardboard	27,963	8,121	60,826	56,227	153,137
Office Paper	---	10,828	8,516	14,994	34,338
Mixed Paper	139,814	10,828	8,516	13,120	172,278
Glass	30,947	2,707	2,433	11,245	47,332
Metals	29,952	2,166	6,083	13,120	51,320
Wood Waste	13,174	541	2433	37,48	19,897
Food Waste	23,388	1,624	3,650	14,994	106,409
Yard Waste	95,937	541	2,433	7,497	45,282
Plastic	57,915	1,624	8,516	9,371	77,426
Textiles	21,376	541	3650	5623	31,189
Other Materials	48,719	3,790	9,432	18,742	80,983
Total Tons	559,257	54,141	121,652	187,423	992,473
Tons per Day**	1,532	148	333	513	2,719

* Includes Public Administration
** 365 days per year.

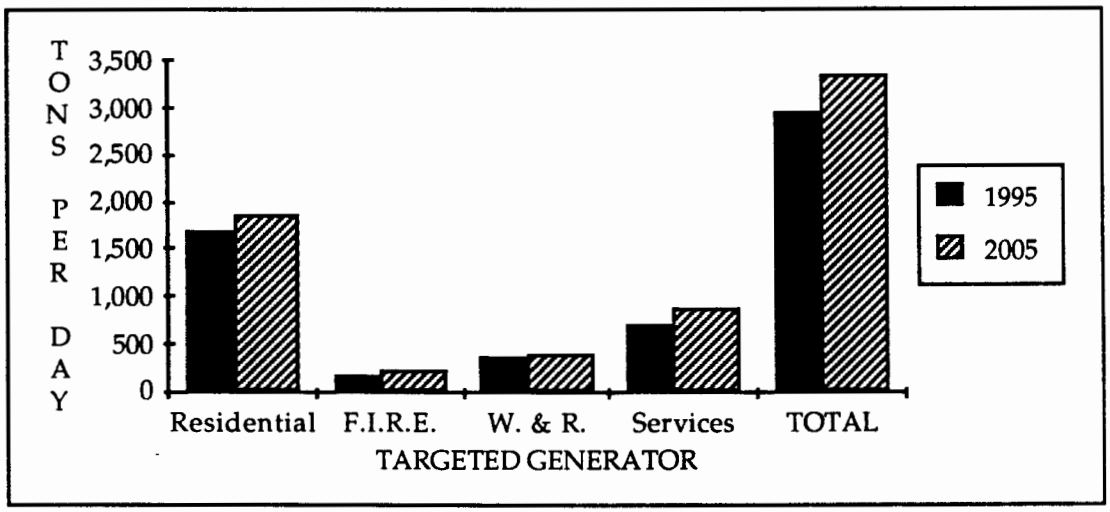
Source: Resource Recycling Systems, Inc. 1988

This volume represents 78% of Oakland County's type II municipal wastes, and 50% of the County's entire waste stream.

As Oakland County becomes more developed, the volume of waste generated by these targeted sectors will grow considerably. Waste volume estimates (in tons per day) for 1995 and 2005 are shown in Exhibit III.7:

EXHIBIT III.7

WASTE VOLUME ESTIMATES FOR 1995 AND 2005
(IN TONS PER DAY)



As the population increases in Oakland County, the amount of waste which is generated by all sectors will also increase. The County must adopt appropriate measures to deal with this increased volume. These measures, reduction, reuse, and recycling/composting, have been introduced in previous sections. They will be discussed in greater detail in the remainder of this report.

SECTION VII

CAPABILITIES ASSESSMENT: PUBLIC AND PRIVATE SECTORS

Previous sections have described in detail the markets, waste stream composition and technology for waste reduction, recycling and composting systems. The most recent section on waste reduction options briefly addressed the issue of institutional support required to guarantee the long term viability of a material recovery strategy. In this section, an assessment is made of the capabilities of both the public and private sectors in Oakland County to develop, implement and operate an aggressive material recovery system to address 20 percent or more of the County waste stream.

We begin with a description of current recycling initiatives in the County. Next an overview is provided of the outreach efforts to contact key decision makers in both the public and private sector waste management system. Finally, the issue of institutional capabilities is addressed in greater detail. This will set the stage for analysis and recommendations that follow in later sections.

EXISTING SYSTEMS FOR WASTE REDUCTION AND MATERIAL RECOVERY

The private sector has always been involved in processing recyclable and reusable material. Scrap metal yards and waste paper dealers are just two examples of the many types of private recycling efforts. Used equipment brokers, resale stores, flea markets, garage sales, auction houses, and antique stores comprise a broad network which facilitates the reuse of materials of all types.

Following is a description of some of the current waste reuse and material recovery activities in Oakland County as of late 1988.

RECYCLING

Limited residential and commercial recycling options are available within the County. For most materials out-of-county brokers and processors, described in the Markets Assessment in Section II, service larger clients in the County and are the principal source of recycling activity for the area. For example, large generators of old corrugated containers (OCC) such as Krogers, the Wixom Ford Plant, and Meijers all have on-site baling equipment and have brokering agreements with a number of dealers from the Southeastern Michigan area. At least two haulers serving Oakland County, Bestway Recycling and Mister Rubbish, currently have or are bringing on-line facilities to bale corrugated. Both of these facilities are located in adjacent counties.

Municipally Sponsored Recycling Programs

The Recycling Center of Birmingham, co-sponsored by the City of Birmingham, accepts newspapers, glass, aluminum, metals, and plastic. The Center is open Saturday mornings.

The Village of Holly Recycling Program operates a drop-off center at the DPW Yard and a curbside collection service to most of the Village. The drop-off center, open during daylight hours, accepts newspaper and glass.

The City of Huntington Woods operates a center in the City Hall parking lot, which is open weekdays for plastics, glass, and used motor oil only, and the first Saturday of the month for all recyclables including newspapers.

The City of Madison Heights Drop-off Center, located near by Public Works building, accepts newspaper, glass, and some plastics 24 hours a day. Used motor oil is accepted Monday through Friday, from 7:00 A.M. to 4:30 P.M.

The St. Joseph grade school in Lake Orion operates an unstaffed newspaper drop-off center during daylight hours.

Five times each year Rochester holds a paper drive for the collection of newspaper and returnable bottles.

The City Parks and Recreation Department in Southfield operates an unstaffed drop-off center for newspapers during daylight hours.

The South Oakland County Incineration Authority (SOCIA) operates a white goods and scrap metal recovery program at its incinerator site in Madison Heights and a leaf transfer and sheet composting operation at is landfill.

These municipal recycling systems within Oakland County are listed below

Organization	Accepted Materials
Recycle Center of Birmingham	N, G, Al, Me, Pl
Village of Holly Recycling Program	N, G
City of Huntington Woods	N, G, Pl, MO, YW
City of Madison Heights	In Start-up Phase
Village of Lake Orion	N
Rochester Paper Drive	N
City of Southfield	N
SOCIA	Me, YW
Multi-Lakes Conservation Association*	N, G

N = Newspaper G = Glass Al = Aluminum Me = Metals Pl = Plastic
MO = Motor Oil
YW = Yard Waste Appl = Appliances
* Members Only

Source: Resource Recycling Systems, Inc., 1988

Newspaper is the primary material for all of Oakland County's programs. Glass, plastic, aluminum, and ferrous containers are collected at a few drop-off sites, while motor oil, yard waste, and appliances are each accepted at one site.

Commercial Recycling Operations

Confidential Records Destruction Service, Inc. destroys records for law offices, banks, laboratories, high technology firms and a number of related businesses in Oakland County. The shredded, pulverized and baled paper is sent to mills in Michigan, Illinois and Wisconsin for recycling.

The Eagle Valley Landfill Recycling Center accepts newspapers, plastics, and appliances during business hours on Fridays and Saturdays. Its parent company, Waste Management, Inc. requires that all their facilities provide some type of recycling opportunity.

JSL Services, Inc. of Bloomfield Hills will shred pallets and selected wood waste streams on-site with their portable tub grinder and materials handling system.

Polymer Plastics, Inc, in Madison Heights, accepts clean milk jugs and other HDPE containers, baled, shredded or loose.

Royal Oak Waste Paper, in the City of Royal Oak, accepts newsprint, old corrugated containers and high grade office papers during business hours at its paper baling facility near downtown Royal Oak.

The St. Julian Wine Tasting Center near Holly, MI pays five cents for each St. Julian bottle which is returned to the Center.

Scrap Metal Dealers: Approximately 15 metal and junk dealers buy and process metals, automobiles, appliances, batteries, radiators, medical x-rays. One of the largest scrap dealers in the area is Standard Lead Co., Inc.. This firm handles an estimated 30,000 to 35,000 tons of non-ferrous metals (copper, brass, aluminum, zinc, lead, stainless steels) each year. Allen & Sons, Inc. in Pontiac is another major scrap metal dealer in the area.

MATERIALS REUSE

Thrift Stores

There are several organizations in Oakland County which collect used household materials, clean and repair them, and sell them to the public. They include: Salvation Army, Value Village, Hadassah Thrift Shop, Saint Vincent de Paul, and the League of Catholic Women.

Salvation Army is a non-profit organization which accepts donations of clothing, cash, household items, and most furniture. Merchandise is sorted, cleaned, and repaired at their warehouse in Romulus, then redistributed to the seven stores in southeast Michigan, five of which are in Oakland County. Proceeds from the sale of the merchandise help to support churches, missions, and shelters operated by Salvation Army.

Value Village Thrift Stores is a private, for-profit establishment which buys used goods from the Purple Heart military organization. The company's eight stores in the Detroit area (one in Ypsilanti) sell clothing, household goods, and furniture.

Hadassah Thrift Shop, located in Ferndale, accepts donations of all personal and household items, except large rugs and large appliances. There is a Six-Dollar Bag Sale, which allows customers to purchase as many items as will fit into a grocery bag for $6. Volunteers and paid personnel clerk the store.

Saint Vincent de Paul has five resale stores in the metro Detroit area. Donations of almost all household and personal items are accepted. The main store, located at 2950 Gratiot, in Detroit, operates a pick-up service. Merchandise is cleaned and sorted at the main store, then distributed to the other shops in the area.

The League of Catholic Women operates three stores in Oakland County. The stores accept all clothing (except that which is very outdated) and household items. The main office in downtown Detroit operates a pick-up service for large items. Items which are in need of repair, or clothing which is outdated, are given to the Capucian Monastery for redistribution to the very needy in downtown Detroit.

The Huntington Woods Recreation Center accepts milk jugs, egg cartons, cardboard tubes, aluminum trays, reusable containers, old clothes, and fabric.

Flea Markets

A number of flea markets operate in the County. The Whoopee Bowl, though not technically a flea market, is a for-profit operation in Clarkston. Merchandise is purchased from businesses because of surpluses, liquidations, overruns, and bankruptcy, then sold in the 20,000 square foot warehouse. It is open 7 days a week throughout the year.

Auction Houses/Clothing Resale Shops/Antique Stores

There is a large selection of antique stores and auction houses in the Oakland County area which offer a wide variety of used products: jewelry, furniture and household items, clothing, artwork, and architectural items (stained glass, lighting, doors, and woodwork).

Classified Ads

Several newspapers in the area offer inexpensive rates for short classified ads.

Another common method of advertising used items in the County is to place announcements on bulletin boards in grocery stores, community centers, laundromats, and in schools and universities.

Rummage/Garage Sales

Rummage and garage sales are commonly used vehicles for the sale of used household products. The most common methods of advertising are signs around the community and classified advertisements in newspapers. The Dinosaur Hill Nature Center, which accepts clean, usable clothing and appliances, sponsors an annual fall garage sale.

ASSESSMENT OF CURRENT DIVERSION CAPACITY

The existing networks discussed above help to reduce the amount of waste which is entering the waste stream and reaching the landfill. However, measuring the impact of current and future activities is quite difficult because

these items are part of a private sector recycling and reuse network which is broad and decentralized and cannot be accounted for. For example, there is no way to quantitatively assess the fact that a household or business donated equipment through a dealer, donated furniture to a thrift shop, traded books at a used bookstore instead of throwing them away, or took an old refrigerator to the scrap yard.

In addition, with rapid development of land in the area, the County can expect a reduction in the availability of convenient low-rent commercial and industrial districts where used merchandise and scrap yard establishments typically operate. One waste paper dealer already is under strong land use related pressure to close down or move due to redevelopment of the adjacent area.

The following two conclusions are possible:

- The capacity of the existing system to collect, process and market twenty to fifty percent of the waste stream in Oakland County through waste reuse, recycling and composting is not currently in place and will need to be developed. Of special concern is processing capacity for most papers , glass, tin cans, LDPE plastic, tires, wood and yard waste. In other areas, such as white goods, metals and HDPE plastic, existing opportunities to use local processing capacity are not taken advantage of.

- The reliability of the existing system over the long term is weak in many areas. The point was made in the Markets Assessment Section that material recovery efforts by the private sector may not survive the coming decade in competition against the joint public/private programs that are expected to dominate. This, combined with many other business pressures, could further weaken the existing material recovery system.

RECYCLING SUBCOMMITTEE

OF THE

SOLID WASTE PLANNING COMMITTEE

The following people and companies devoted their time and effort to assisting the County in the development of a County recycling program:

Alice Tomboulian, Chairperson
Nancy Smith
Thomas P. Stevens
Ruth Johnson-Nanney
Betty McMath
John King
Waste Management, Inc.
Steve Marshall
Glenda Hopp
Marilyn Rauth
Claudia Filler
James Meenahan
Frank Russell

APPENDIX B

SUBSYSTEM

IMPLEMENTATION PLANS

PONTIAC

City of Pontiac

Walter Moore
Mayor

Executive Office
450 Wide Track Drive, East
Pontiac, Michigan 48058

December 21, 1987

Mr. Milton W. Handorf, P.E.
Director, Oakland County
Department of Public Works
One Public Works Drive
Pontiac, MI 48054

Dear Mr. Handorf:

In response to your request for information to assist in the preparation of the five-year update to Oakland County's Act 641 Plan, Pontiac's plans for solid waste disposal through the year 2010 are as follows.

Current design capacity of the Collier Road Landfill will meet the City's Type II waste disposal needs for approximately ten (10) years based upon 1985-86 landfill use. A planned lateral expansion of the landfill would add another eight (8) years of useful life. Pontiac is presently exploring waste reduction and recycling methods designed to reduce the amount landfilled by 25-40%. The success of these programs should assure disposal of Type II wastes at the Collier Road Landfill through the year 2010.

A major portion of the Type III (construction/demolition) wastes generated in Pontiac are disposed of by private haulers at facilities other than the Collier Road Landfill. Pontiac has no direct knowledge of quantities generated or which facilities are utilized. It is presumed that haulers use facilities both within and outside Oakland County. It is expected that the Act 641 Plan Update will identify facilities with adequate capacity for Type III solid wastes.

Sincerely yours,

Walter Moore

Walter Moore
Mayor

WM/pm

cc: Commissioner Hubert Price, Jr.
Commissioner Nancy McConnell
Commissioner John Rowland

City of Pontiac, Michigan
WALLACE E. HOLLAND
MAYOR

Executive Office
450 Wide Track Drive, East
Pontiac, Michigan 48058

313-857-7614
Fax 313-338-7680

March 6, 1990

Oakland County Dept. of Public Works
Solid Waste Division
One Public Works Drive
Pontiac, MI 48054-1695

Attention: Roger J. Smith, P.E.

Dear Mr. Smith:

On behalf of the City of Pontiac, I wish to comment on the proposed Intergovernmental Agreement which provides for participation in the County's solid waste management system, as follows:

As it now stands, the County would require that a municipality commit all of the waste generated within its borders to the system, excepting yard waste and source separated recyclables if the municipality wished to provide for the processing of these materials at other than a system facility. This position serves to exclude the City of Pontiac's financial obligation as owner of the Collier Road Landfill. Pontiac wishes to explore the ability to commit a portion of the waste stream to the county system while continuing to operate the Collier Road Landfill for primarily waste materials which are non-combustible, such as fly ash, waste water sludge and certain other materials in quantities to assure efficient landfill operation. This would leave an estimated 150-200 tons per day which could be diverted to compost, material recovery or waste-to-energy facilities.

The requirement that municipalities adopt ordinances embracing the separation of recyclable materials at the site of generation is not realistic or feasible for cities like Pontiac which is made up of large industrial and commercial components. While Pontiac agrees that source separation is feasible and desirable in the residential sector, better methods exist to assure that industrial and commercial recycling takes place to an extent that maximizes potential removal of recyclables from these sources.

The City of Pontiac is moving to site an Act 641 Material Recovery Facility within its boundaries. If included in the County system, Pontiac could require that the industrial/commercial sectors separate wet waste from dry at their sites of generation, with dry waste (which is not sorted further) being required to be delivered to the MRF for further separation before final disposal at either the landfill or waste-to-energy facility.

Insofar as enforcement of the ordinances required by the Agreement is concerned, Pontiac supports the addition of language authorizing the County to act as its agent to the extent proposed by the Oakland County Association of Township Supervisors in its alternate draft which was distributed at the 2/15/90 meeting with the Chief administrative officials of Oakland County communities.

I am eager to meet with you to discuss these matters and to remove existing obstacles to Pontiac's participation in the County solid waste system.

Sincerely yours,

Wallace E. Holland
Mayor

WEH/CF:jh

SOCRRA

Southeastern Oakland County Incinerator Authority

MAILING ADDRESS
P. O. Box 721248
Berkley, Michigan 48072-1248
Main Office (313) 288-5150

INCINERATOR PLANT
29470 John R Road
Madison Heights, Michigan 48071
Inc. Plant (313) 547-5660

May 11, 1989

Mr. Milton W. Handorf, P.E.
Director, Oakland County
Department of Public Works
One Public Works Drive
Pontiac, MI 48054

Dear Mr. Handorf:

The Authority has reviewed its current operation and has developed its plans for solid waste disposal thru the year 2010.

The plan outline is presented to assist in the County's preparation of the five year update to Oakland County's Act 641 Plan.

Currently, the Authority is utilizing the disposal services of Browning Ferris Industries and City Disposal to handle the majority of the waste within our 14 municipalities.

The Authority is operating the Transfer facilities at both our Incinerator Plant and the Transfer Station.

Our landfill is currently receiving a small amount of waste and the compost material being collected separately by our Cities.

Waste to Energy Plant

The Authority is proceeding with plans to retrofit our Incinerator Plant to provide Waste to Energy capability along with the installation of BACT Air Pollution Equipment, and Ash Management Systems.

This project is being carried out in four phases all of which are underway.

1. The Authority is in the process of holding public hearings in each City for the purpose of presenting the project and the tipping fee projections for the proposed 30 year energy contract with the Detroit Edison Company.

The municipalities are being asked to a) approve the project, b) extend the existing contracts with the Authority from July 1, 1997 to June 30, 2019, c) approve a name change for the Authority to the Southeastern Oakland County Resource Recovery Authority.

2. The Authority has the proper "PURPA" notifications in place and we are holding discussions with the Detroit Edison Company relative to the energy contract.

3. The Authority will submit our permit application to construct to the D.N.R. Air Quality Division during the second week of June.

4. The Authority is developing the Joint Venture Agreement with Black & Veatch, the Project's consulting engineer, and the operating agreement with the Detroit Edison Company.

The Edison Company's Syndeco Division will operate the energy side of the Waste to Energy Plant.

The attached schedule reflects our time table for the Waste to Energy Project.

The process capacity of this plant will be 575 tons per day and will reclaim 40 tons per day of ferrous and non-ferrous metals.

A high torque-low speed shredder will be installed at the plant to process the 40-100 tons per day of bulky wood wastes that are collected separately by the Authority's municipalities and private contractors. That waste will then be incinerated.

Transfer Station

The Authority plans to retrofit our Transfer Station (see attached sketch) to handle the recyclable materials collected by our municipalities and the private waste collectors within the Authority's area. A baler will be installed within the next few months so that the cardboard materials can be separated from the waste stream and recycled.

The Transfer Station will have the capability of handling 400 tons per day of separated materials and 200 tons of "Waste to Energy" Bypass material.

Bypass material and the compost material consisting of grass, garden wastes, and leaves will be transferred thru the existing hoppers at the Station. The recycled material will be placed on the existing tipping floor, sorted if necessary, and conveyed to the new processing area. The goal of the Authority's municipalities is to collect source separated materials for storage and processing at the Transfer Station and achieve a 25% recycling rate by 1995.

Landfill

The Authority's proposed landfill site located north of Avon Road across from the present landfill site will be an ash monofill and will incorporate an air supported structure over the fill. Attached is an advisory analysis from the Waste Management Division of the D.N.R.

which sets forth eleven points to be addressed in the design of the landfill. The Authority has designated a design team consisting of the firms of Neyer, Tiseo and Hindo and Emcon Associates to develop the plans and specifications for the landfill, and to satisfy all design conditions required by the State for the ash monofill. The schedule for the ash fill construction coincides with the Waste to Energy permitting and construction dates. The ash monofill will handle the Authority's ash disposal requirements for 25 years. The Authority will require landfill capacity in either the County's landfill or in a landfill owned by a private company for bypass waste and waste that cannot be combusted, recycled, or composted.

Composting

The Authority has been composting leaves at its landfill site south of Avon Road since 1971. This process has proved to be very beneficial from the standpoint of reducing the amount of material landfilled and also it has provided the Authority and its member municipalities with a soil conditioner that is similar to peat moss.

The Authority currently has a project underway where grass is being collected separately and is being introduced into the composting operation.

The Authority was successful in obtaining a Clean Michigan Fund grant for compost turnover equipment which will aid in blending the grass and leaves together so a uniform product can be achieved.

The Authority anticipates that 15% or 31,000 tons of the residential waste stream will be diverted to our composting operation by 1995.

Flow Control

The Authority has the cooperation of its member municipalities in providing a waste stream that contains all of the residential waste and 15-20% of the commercial waste within the Authority area.

Recognizing that the private waste industry is handling the remaining tonnage generated within our area, the Authority is committed to diverting the material that is presently going to a landfill to first be subject to our recycling efforts.

The location of the Authority's facilities within our waste generation area assures us of a cost advantage to process that material for recycling, and to divert the remainder to our Waste to Energy Plant.

The attached cost projections for our facilities are competitive with the alternatives available to the private contractor, and a large portion of the waste stream will come to the Authority's facilities once our Waste to Energy plant is on line and the Authority's processing capabilities are increased.

The Authority does not wish to dictate flow control to the private collectors in our area, but would rather allow the economics to dictate the direction of the waste flow.

Disposal Fees

The Authority is currently charging its municipalities $30 per ton to process and dispose of the mixed waste materials delivered to the Authority's Incinerator Plant and Transfer Station.

A fee of $15 per ton is charged for all compost materials delivered by our member municipalities. It is the Authority's intent to maintain a similar fee schedule for all separated recyclables generated in the Authority's service area and delivered to the Authority's facilities.

Oakland County's Management System

The Authority has reviewed the Oakland County report dated April 17, 1989 and also the reports detailing the construction contracts for the Incinerator in the Pontiac area. You are to be commended for an excellent waste management report that blends the efforts of individual groups into a cohesive plan of action. Attached is a report submitted to the Authority's Board of Trustees that was prepared by Bendzinski and Company detailing a comparison of rates as presented by the County and the Authority.

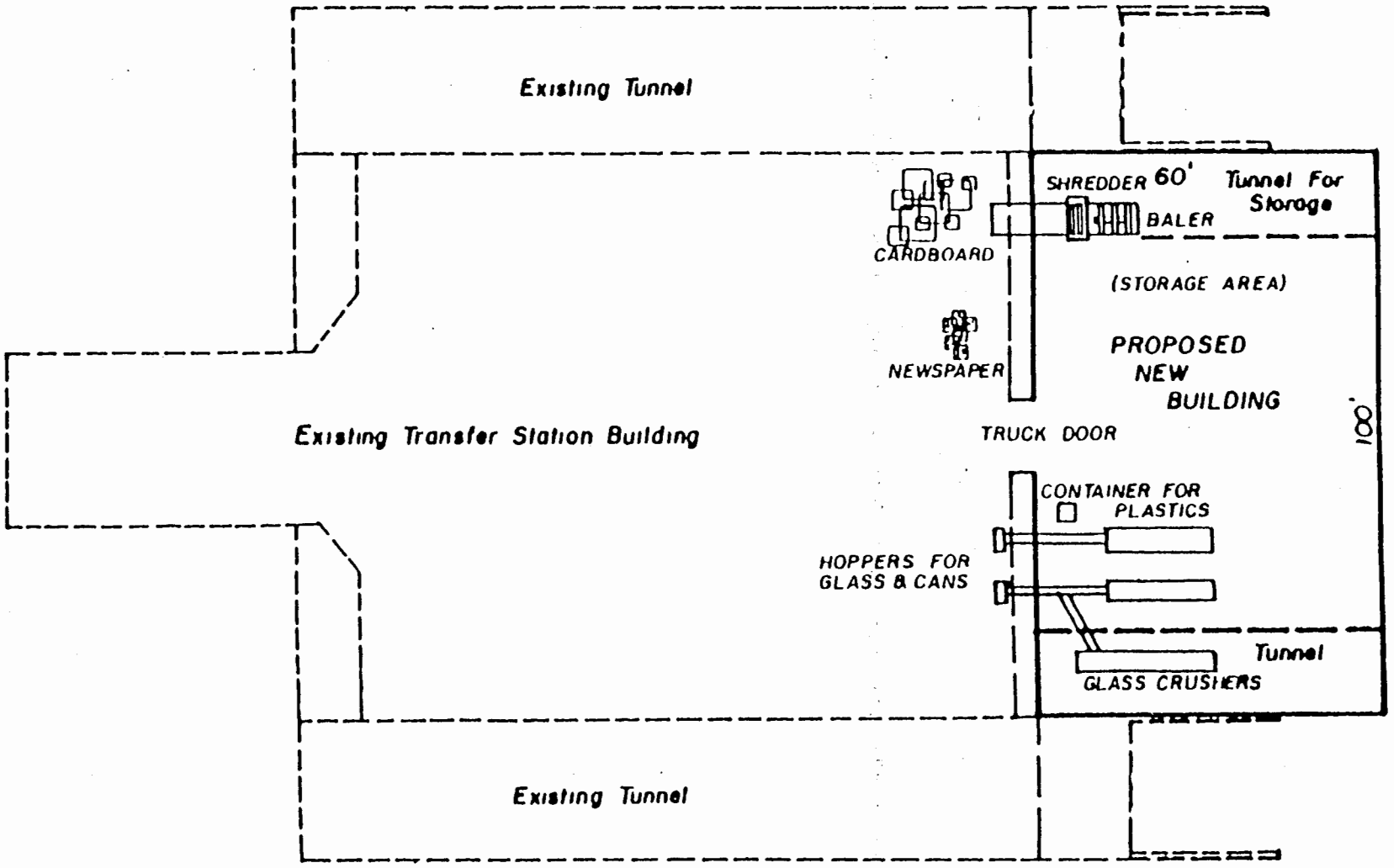
The costs as outlined provide the impetus for the Authority to proceed with its Waste Management Plan as set forth in this communication.

There is much work to be done by both organizations and the Authority stands ready to assist the County when requested to work towards implementing the County's Waste Management Plan.

Very truly yours,

Thomas G. Waffen, P.E.
General Manager

TGW/ksh

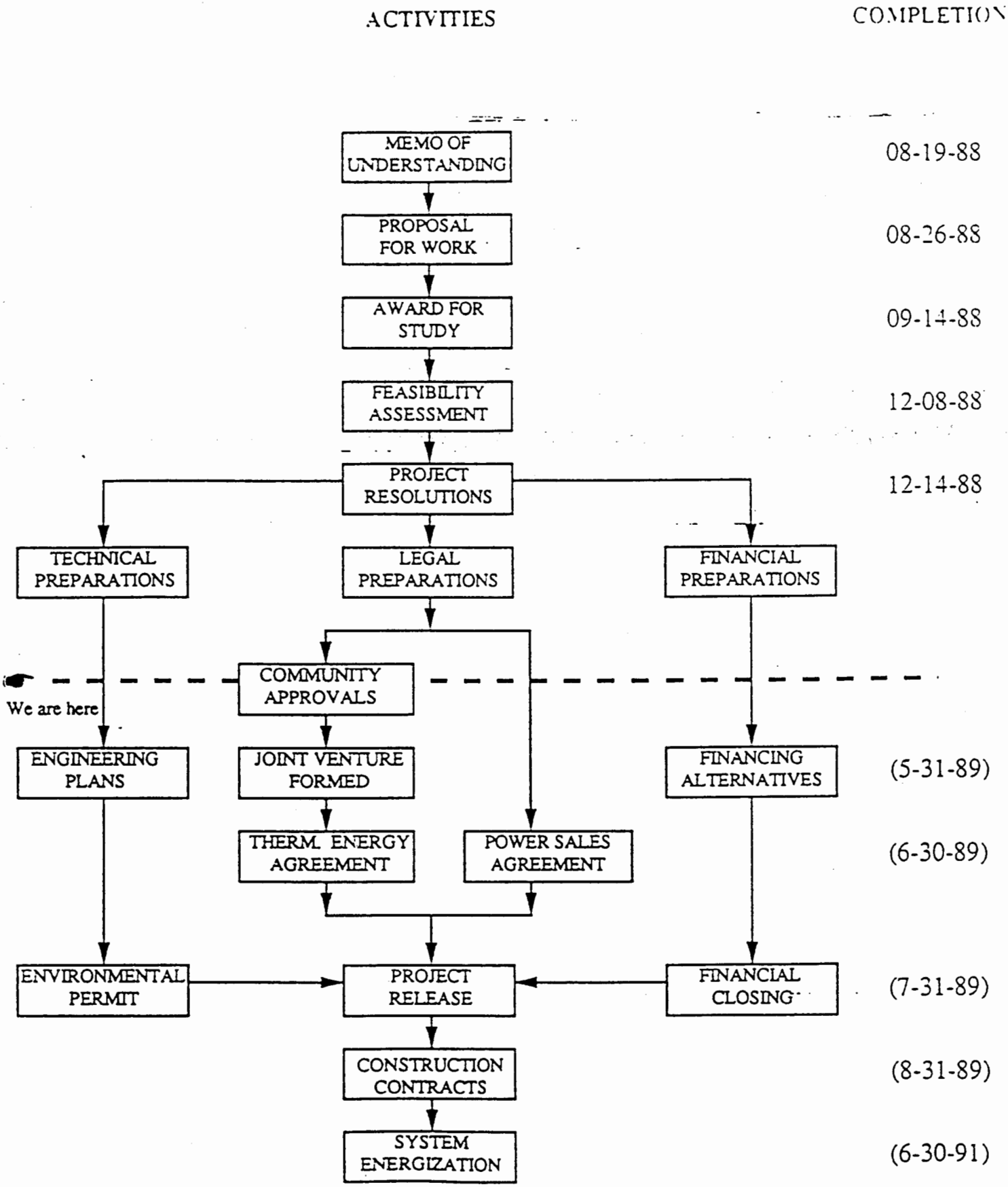


Date: 4-7-89

Scale: 1" = 30'

TRANSFER STATION - RETROFIT FOR RECYCLING

SOCIA PROJECT SCHEDULE



STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

David F. Hales, Director

S.E. MICHIGAN FIELD OFFICE
Waste Management Division
505 W. Main
Northville, MI 48167

December 20, 1988

Mr. Tom Waffen
Southeastern Oakland County Incinerator Authority
3910 West Webster Road
P.O. Box 1248
Berkley, Michigan 48022

SUBJECT: Solid Waste Disposal Area Type II Land
with Inflatable Air Structure
City of Rochester Hills
Oakland County, Michigan

Dear Mr. Waffen:

This is in response to the request by the Southeastern Oakland County Incinerator Authority (SOCIA) for an advisory analysis on the proposed subject facility. Specifically, SOCIA proposes to construct a Type II sanitary landfill (known as the North Avon Site) consisting of approximately 56 acres in the southeast section of the City of Rochester Hills, Oakland County, Michigan. This request for an advisory analysis was made pursuant to Section 11(a) of the Solid Waste Management Act, 1978, P.A. 641, as amended (Act 641).

As stated in Rule 303 of Act 641, "The purposes of the advisory analysis before application is made for a construction permit under Section 11(1) of the Act are to inform the applicant of other permits which may be required for the proposed landfill, such as air emission and water discharge permits or soil erosion and sedimentation control permits; to provide information on known conditions which may affect the proposed site; and to discuss the application and submission requirements and procedures."

Further, as stated in Rule 203(a) of Act 641, "Nothing in the advisory analysis shall be considered to constitute an approval or denial for a construction permit or operating license."

The Director of the Department has previously denied applications from SOCIA for a construction permit for a landfill at this site. These prior denials were without prejudice to SOCIA to submit a new application. However, all of the reasons for the prior denials must be addressed in any subsequent construction permit application. The reasons for denial of the previous application included inadequate control of air pollution emissions from the landfill and the potential for violations of Rule 901 of the Michigan Air Pollution Act, 1965, P.A. 348, as amended (Act 348). Surrounding land uses are primarily residential, recreational, landfills, and mining. The properties adjacent to the proposed site include the Rochester-Utica Recreation Area on the north and eastern boundaries. Avon Road is at the southern boundary. Rochester Estates Mobile Home Park is at the Western Boundary.

The current proposal to operate the landfill under an inflatable air structure may have merit and allow for landfill construction with less than the previously recommended isolation distance needed to insure compliance with air quality standards. The proposed inflatable air structure would contain air locks and negative pressure exhaust systems to insure that odorous air emission will not be released except through an exhaust system using activated carbon or other air emission control measures. Although the concept appears feasible, the following must be satisfactorily addressed for the Department to evaluate the proposal:

1. Act 348 permit for any aspects of your proposal involving air emission control devices. Specific information on the proposed air emission control devices, including designing information, maintenance procedures and efficiency of the proposed activated carbon system would be required in the Act 348 permit application.

2. Adequate control of methane gas that is produced within the landfill. If not vented properly, methane not only could cause fires but also presents an explosion hazard. The proposal must address the potential for fires within the structure, the potential to ignite the structure, procedures to extinguish fires and procedures to repair or replace the structure in the event of damage or destruction.

3. A description of the mechanical systems that will insure a negative pressure is maintained within the structure to prevent odorous air emission from being released as trucks enter and exit the structure.

4. A description of the means to control fugitive air emissions from truck traffic both inside and outside the structure during all stages of landfill construction, from preliminary site development through final closure.

5. Control of odors and decomposition gases resulting from decomposing refuse when the structure is removed from a completed area. The use of gas extraction system or similar technologies will be required to ensure that decomposition gases do not result in emissions which may result in violations of Act 348.

6. Documentation that objectionable noises will not result from the operation and maintenance of the air structure and the proposed blowers and oxidizers.

7. A demonstration that the air structure will remain intact during high winds and will not be damaged due to the accumulation of ice or snow.

8. An evaluation of alternate liner systems for the landfill including especially the installation of a double liner with a leak detection system between the liners.

9. A demonstration of the potential impact of the use of less than six inches daily soil cover during landfill operations as part of any formal request for a variance from this requirement.

10. An adequate final cover material to include at least two feet of clay meeting the specifications of Rule 305(10) of Act 641 as well as additional soil cover to support vegetative growth.

11. Obtain a permit pursuant to the Wetland Protection Act, 1979, P.A 203, for any use of the wetland on the property for soil and sedimentation control.

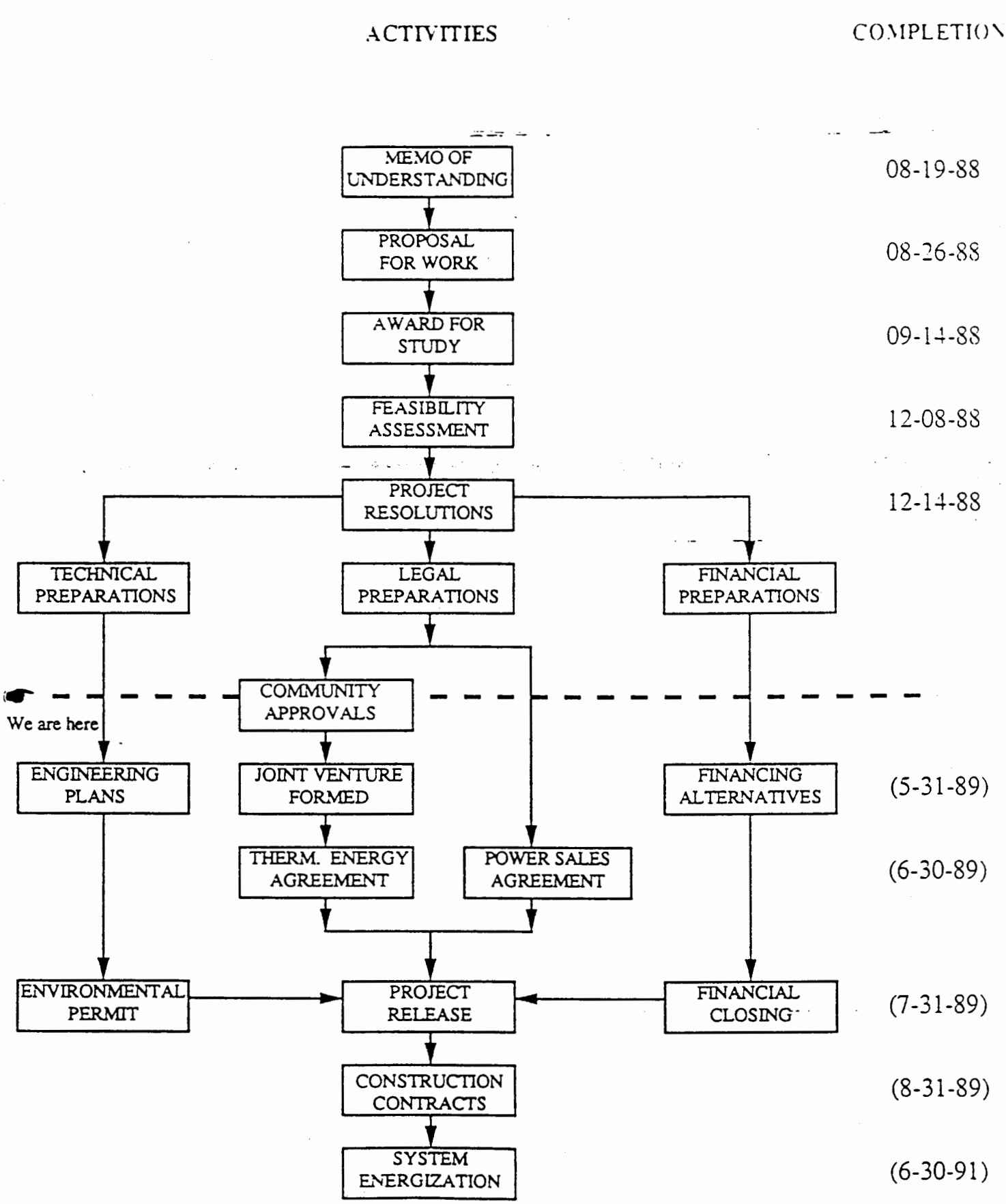
If you have any questions concerning this advisory analysis, please contact me at (313) 344-4670.

Sincerely,

Benedict N. Okwumabua, Ph.D.
District Supervisor
Waste Management Division

BO:cm
cc: Mr. Dennis Drake, DNR
Mr. Fred Reith, DNR
Mr. Ken Burda, DNR
Mr. Mark Meados, AAG
Mr. Ron Grimes, Oakland Co. Health Dept.

SOCIA PROJECT SCHEDULE



Bendzinski & Co.
municipal finance advisors

May 5, 1989

Mr. Tom Waffen, Director
Southeastern Oakland County Incinerator Authority
P.O. Box 72148
Berkley, Michigan 48072

Dear Tom:

Pursuant to the directions given to us at our meeting April 20 with the SOCIA Board and the County of Oakland representatives, we are submitting, for your review and comment, the following revised schedules:

1. A summary schedule comparing the tipping fees for the three SOCIA alternatives with the County of Oakland proposal.

2. Schedule 1, a Schedule of tipping fee requirements for operation, maintenance and debt service without a waste-to-energy (adding the pollution control devices only).

3. Schedule 2, a Schedule of cash flow and debt service requirements for the joint venture waste-to-energy alternative, assuming continued operation of the landfill <u>including</u> the capital cost of the dome by SOCIA.

4. Schedule 2A, a Schedule of tipping fee requirements for operation, maintenance and debt service requirements, based on the assumption set forth in Schedule 2 above.

5. Schedule 2C, a Schedule of cash flow and debt service requirements for the joint venture waste-to-energy alternative, utilizing the same assumptions set forth in the County proposal. Those assumptions are summarized in Table A of this report.

6. Schedule 2AC, a Schedule of tipping fee requirements for operation, maintenance and debt service, based upon the assumption set forth in schedule 2C.

7. Table A, which takes the assumptions set forth in the original feasibility study prepared by Detroit Edison and Black & Veatch, adjusted to reflect the same <u>assumptions</u> that are used in the Oakland County Proposal presented to the SOCIA Board on April 20, 1989.

As can be seen from reviewing the tipping fee comparison, both of the waste-to-energy alternatives proposed by the joint venture, and the joint venture proposal adjusted to reflect the County assumptions, result in substantially lower tipping fees than the County proposal. Even the pollution control only alternative to the existing incinerator facility alternative results in lower tipping fee to the Constituent members than does the County Proposal.

We wish to point out that the assumptions in the SOCIA Alternative No. 2 (which is the waste-to-energy alternative as proposed in the joint venture feasibility study of January 1989), incorporates the cost of the landfill and transportation of the solid waste from the existing transfer stations operated by the Authority to the Waste-to-Energy plant. Neither the County alternative nor the SOCIA Waste-to-Energy Alternative No. 3 assumes that service. As a matter of fact, in as much as these alternatives have been based on the County's assumptions, neither of these alternatives include the cost of landfill as an actual cost, but have based it on a projected cost per ton basis, which we believe may be somewhat understated.

Based on our analysis of the various alternatives, it is our opinion that, from a financial point of view, the Authority should proceed with the waste-to-energy proposal as set forth in the January feasibility study of the joint venture. While there have been many allegations that the County Proposal is based upon "bid prices" we do not believe that the County has a "firm bid price", but is really at the same stage as SOCIA, in terms of the design and build alternative.

We believe that the SOCIA approach is really a more conservative approach, because you are controlling the design criteria, and then requesting contractors to bid upon that design criteria once it has been accepted and approved by the State and the EPA. In our opinion, the County approach places that responsibility with the contractor and gives the contractor the ability to increase the cost, should additional environmental restraints be placed upon the them by the various State and Federal agencies.

Finally, we would like to point out that the County Proposal and the calculation of tipping fees include the assumption that there will be interest earnings on the Debt Service Reserve. SOCIA Alternative 3 does not anticipate any interest earnings on any such Reserve.

We believe we have presented an "apples-to-apples" comparison for purposes of assisting the Board and the local legislative bodies of the constituent member communities in making a decision as to which alternative is most cost-effective to them. We believe this summarizes our discussions, and our analysis of the alternatives. Should you have any questions, or need any additional information, please do not hesitate to call.

Sincerely,

BENDZINSKI & CO.
Municipal Finance Advisors

Robert C. Bendzinski

RCB:veb
Enclosures

To: K. Wohlgemuth
Fr: WP Sutter

SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
NET GENERATION REPORT

	GROSS GEN CAPACITY MW	NET GEN CAPACITY MW	TRANS LOSSES %	AUX POWER %	MSW COLLECTED TONS	MSW INCINER TONS	HEATING VALUE BTU/LB	HEAT AVAILABLE MBTU/HR	CONVERS EFFICIENCY BTU/KWH	MAX AVAIL FUEL EQV MW	CAPACITY FACTOR %	HEAT CONSUMED MBTU/YR	GROSS GENERATION MWH/YR	AUX PWR CONSUMED MWH/YR	TRANS LOSSES MWHRS	NET GENERATION MWHRS
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1992	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1993	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1994	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1995	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1996	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1997	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1998	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
1999	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2000	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2001	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2002	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2003	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2004	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2005	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2006	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2007	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2008	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2009	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2010	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2011	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2012	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2013	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2014	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2015	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2016	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2017	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2018	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2019	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941
2020	14.000	13.000	1.00	4.00	233,000	210,000	5,000	240	17,500	13.699	85.00	1,785,000	102,000	4,080	979	96,941

04/21/89 09:41
NEWSOC SOC10489

SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
ESCROW REPORT

	PAYMENT CENT/KWH	INTEREST RATE	ESCROW DEPOSIT	WITHDRAWLS	INTEREST	CASH FLOW	BALANCE	ACCUM CAP PMTS + INT	CAP REFUND REQD %	CAP REFUND LIAB + INT	CAP REFUND OWED
1990	-	8.00	-	-	-	-	-	-	-	-	-
1991	-	8.00	-	-	-	-	-	3,125,371	100.00	3,125,371	3,125,371
1992	-	8.00	-	-	-	-	-	6,500,772	96.55	6,276,495	6,276,495
1993	-	8.00	-	-	-	-	-	10,146,205	93.10	9,446,117	9,446,117
1994	-	8.00	-	-	-	-	-	14,083,273	89.65	12,625,654	12,625,654
1995	-	8.00	-	-	-	-	-	18,335,306	86.20	15,805,034	15,805,034
1996	-	8.00	-	-	-	-	-	22,927,501	82.75	18,972,507	18,972,507
1997	-	8.00	-	-	-	-	-	27,887,073	79.30	22,114,449	22,114,449
1998	-	8.00	-	-	-	-	-	33,243,410	75.85	25,215,126	25,215,126
1999	-	8.00	-	-	-	-	-	39,028,254	72.40	28,256,456	28,256,456
2000	-	8.00	-	-	-	-	-	45,275,885	68.95	31,217,723	31,217,723
2001	-	8.00	-	-	-	-	-	52,023,327	65.50	34,075,279	34,075,279
2002	-	8.00	-	-	-	-	-	59,310,565	62.05	36,802,205	36,802,205
2003	-	8.00	-	-	-	-	-	67,180,781	58.60	39,367,938	39,367,938
2004	-	8.00	-	-	-	-	-	75,680,615	55.15	41,737,859	41,737,859
2005	-	8.00	-	-	-	-	-	84,860,435	51.70	43,872,845	43,872,845
2006	-	8.00	-	-	-	-	-	94,774,641	48.25	45,728,764	45,728,764
2007	-	8.00	-	-	-	-	-	105,481,984	44.80	47,255,929	47,255,929
2008	-	8.00	-	-	-	-	-	117,045,913	41.35	48,398,485	48,398,485
2009	-	8.00	-	-	-	-	-	129,534,958	37.90	49,093,749	49,093,749
2010	-	8.00	-	-	-	-	-	143,023,126	34.45	49,271,467	49,271,467
2011	-	8.00	-	-	-	-	-	157,590,347	31.00	48,853,008	48,853,008
2012	-	8.00	-	-	-	-	-	173,322,946	27.55	47,750,472	47,750,472
2013	-	8.00	-	-	-	-	-	190,314,153	24.10	45,865,711	45,865,711
2014	-	8.00	-	-	-	-	-	208,664,656	20.65	43,089,251	43,089,251
2015	-	8.00	-	-	-	-	-	228,483,200	17.20	39,299,110	39,299,110
2016	-	8.00	-	-	-	-	-	249,887,227	13.75	34,359,494	34,359,494
2017	-	8.00	-	-	-	-	-	273,003,576	10.30	28,119,368	28,119,368
2018	-	8.00	-	-	-	-	-	297,969,234	6.85	20,410,892	20,410,892
2019	-	8.00	-	-	-	-	-	324,932,143	3.40	11,047,693	11,047,693
2020	-	8.00	-	-	-	-	-	354,052,086	-	-	-

04/21/89 09:41
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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
ASSUMPTIONS REPORT

	O AND M PRICE	OM PRICE ESCAL	CAPACITY CENT/KWH	ENERGY PRICE	ENERGY ESCAL	DEBT INT RATE	DECO ADMIN RATE	OM ESCAL FACTOR	PROJ ADMIN PERCENT	DEPR LIFE
1990	.400	-	-	2.000	-	-	-	1.000	-	-
1991	.412	3.00	3.100	2.130	6.50	11.00	10.00	1.060	3.50	30
1992	.424	3.00	3.100	2.268	6.50	11.00	10.00	1.141	3.50	30
1993	.437	3.00	3.100	2.416	6.50	11.00	10.00	1.218	3.50	30
1994	.450	3.00	3.100	2.573	6.50	11.00	10.00	1.301	3.50	30
1995	.464	3.00	3.100	2.740	6.50	11.00	10.00	1.389	3.50	30
1996	.478	3.00	3.100	2.918	6.50	11.00	10.00	1.484	3.50	30
1997	.492	3.00	3.100	3.108	6.50	11.00	10.00	1.585	3.50	30
1998	.507	3.00	3.100	3.310	6.50	11.00	10.00	1.693	3.50	30
1999	.522	3.00	3.100	3.525	6.50	11.00	10.00	1.808	3.50	30
2000	.538	3.00	3.100	3.754	6.50	11.00	10.00	1.931	3.50	30
2001	.554	3.00	3.100	3.998	6.50	11.00	10.00	2.062	3.50	30
2002	.570	3.00	3.100	4.258	6.50	11.00	10.00	2.202	3.50	30
2003	.587	3.00	3.100	4.535	6.50	11.00	10.00	2.352	3.50	30
2004	.605	3.00	3.100	4.830	6.50	11.00	10.00	2.512	3.50	30
2005	.623	3.00	3.100	5.144	6.50	11.00	10.00	2.683	3.50	30
2006	.642	3.00	3.100	5.478	6.50	11.00	10.00	2.865	3.50	30
2007	.661	3.00	3.100	5.834	6.50	11.00	10.00	3.060	3.50	30
2008	.681	3.00	3.100	6.213	6.50	11.00	10.00	3.268	3.50	30
2009	.701	3.00	3.100	6.617	6.50	11.00	10.00	3.490	3.50	30
2010	.722	3.00	3.100	7.047	6.50	11.00	10.00	3.728	3.50	30
2011	.744	3.00	3.100	7.505	6.50	11.00	10.00	3.981	3.50	30
2012	.766	3.00	3.100	7.993	6.50	11.00	10.00	4.252	3.50	30
2013	.789	3.00	3.100	8.513	6.50	11.00	10.00	4.541	3.50	30
2014	.813	3.00	3.100	9.066	6.50	11.00	10.00	4.850	3.50	30
2015	.838	3.00	3.100	9.655	6.50	11.00	10.00	5.179	3.50	30
2016	.863	3.00	3.100	10.283	6.50	11.00	10.00	5.532	3.50	30
2017	.889	3.00	3.100	10.951	6.50	11.00	10.00	5.908	3.50	30
2018	.915	3.00	3.100	11.663	6.50	11.00	10.00	6.310	3.50	30
2019	.943	3.00	3.100	12.421	6.50	11.00	10.00	6.739	3.50	30
2020	.971	3.00	3.100	13.229	6.50	11.00	10.00	7.197	3.50	30

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
REVENUE REPORT

	O AND M REVENUE	CAPACITY REVENUE	ENERGY REVENUE	PWR SALES REVENUE	ESCROW INTEREST	INVESTMENT INCOME	TOTAL REVENUE
1990	-	-	-	-	-	-	-
1991	399,396	3,005,165	2,064,839	5,469,400	-	-	5,469,400
1992	411,378	3,005,165	2,199,053	5,615,596	-	-	5,615,596
1993	423,719	3,005,165	2,341,992	5,770,876	-	-	5,770,876
1994	436,431	3,005,165	2,494,221	5,935,817	-	-	5,935,817
1995	449,524	3,005,165	2,656,346	6,111,034	-	-	6,111,034
1996	463,010	3,005,165	2,829,008	6,297,182	-	-	6,297,182
1997	476,900	3,005,165	3,012,894	6,494,958	-	-	6,494,958
1998	491,207	3,005,165	3,208,732	6,705,103	-	-	6,705,103
1999	505,943	3,005,165	3,417,299	6,928,407	-	-	6,928,407
2000	521,121	3,005,165	3,639,424	7,165,710	-	-	7,165,710
2001	536,755	3,005,165	3,875,986	7,417,906	-	-	7,417,906
2002	552,858	3,005,165	4,127,926	7,685,948	-	-	7,685,948
2003	569,443	3,005,165	4,396,241	7,970,849	-	-	7,970,849
2004	586,527	3,005,165	4,681,996	8,273,688	-	-	8,273,688
2005	604,122	3,005,165	4,986,326	8,595,613	-	-	8,595,613
2006	622,246	3,005,165	5,310,437	8,937,848	-	-	8,937,848
2007	640,913	3,005,165	5,655,616	9,301,694	-	-	9,301,694
2008	660,141	3,005,165	6,023,231	9,688,536	-	-	9,688,536
2009	679,945	3,005,165	6,414,741	10,099,851	-	-	10,099,851
2010	700,343	3,005,165	6,831,699	10,537,207	-	-	10,537,207
2011	721,354	3,005,165	7,275,759	11,002,278	-	-	11,002,278
2012	742,994	3,005,165	7,748,684	11,496,843	-	-	11,496,843
2013	765,284	3,005,165	8,252,348	12,022,797	-	-	12,022,797
2014	788,243	3,005,165	8,788,751	12,582,158	-	-	12,582,158
2015	811,890	3,005,165	9,360,020	13,177,074	-	-	13,177,074
2016	836,247	3,005,165	9,968,421	13,809,832	-	-	13,809,832
2017	861,334	3,005,165	10,616,368	14,482,867	-	-	14,482,867
2018	887,174	3,005,165	11,306,432	15,198,771	-	-	15,198,771
2019	913,789	3,005,165	12,041,350	15,960,304	-	-	15,960,304
2020	941,203	3,005,165	12,824,038	16,770,406	-	-	16,770,406

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
INCOME STATEMENT

	TOTAL REVENUE	DECO ADMIN	THERM EXPENSE	OPER AND MAINT	ADMIN AND GENERAL	INSURANCE EXPENSE	BOOK DEPREC	INTEREST EXPENSE	INT DURING CONSTR	TOTAL EXPENSES	INCOME BEF TAXES	INCOME TAXES	NET INCOME	DECO SHARE	DMV SHARE	SOCIA SHARE
1990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1991	5,469,400	96,941	758,338	780,299	191,429	100,000	548,600	1,379,674	-	3,855,281	1,614,119	175,752	1,438,366	359,592	359,592	719,183
1992	5,615,596	96,941	807,629	788,912	196,546	106,500	548,600	1,293,445	-	3,838,572	1,777,024	287,097	1,489,926	372,482	372,482	744,963
1993	5,770,876	96,941	860,125	800,269	201,981	113,423	548,600	1,207,215	-	3,828,554	1,942,322	393,660	1,548,662	387,165	387,165	774,331
1994	5,935,817	96,941	916,034	816,056	207,754	120,795	548,600	1,120,985	-	3,827,164	2,108,653	495,538	1,613,115	403,279	403,279	806,557
1995	6,111,034	96,941	975,576	834,737	213,886	128,647	548,600	1,034,756	-	3,833,142	2,277,892	593,872	1,684,020	421,005	421,005	842,010
1996	6,297,182	96,941	1,038,988	854,785	220,401	137,009	548,600	948,526	-	3,845,250	2,451,932	689,754	1,762,179	440,545	440,545	881,089
1997	6,494,958	96,941	1,106,522	873,065	227,324	145,914	548,600	862,296	-	3,860,663	2,634,296	751,030	1,883,266	470,816	470,816	941,633
1998	6,705,103	96,941	1,178,446	896,113	234,679	155,399	548,600	776,067	-	3,886,244	2,818,859	813,782	2,005,078	501,269	501,269	1,002,539
1999	6,928,407	96,941	1,255,045	920,805	242,494	165,500	548,600	689,837	-	3,919,222	3,009,185	878,492	2,130,693	532,673	532,673	1,065,346
2000	7,165,710	96,941	1,336,623	947,247	250,800	176,257	548,600	603,608	-	3,960,075	3,205,635	945,283	2,260,350	565,087	565,087	1,130,175
2001	7,417,906	96,941	1,423,504	975,550	259,627	187,714	548,600	517,378	-	4,009,313	3,408,593	1,014,291	2,394,302	598,575	598,575	1,197,151
2002	7,685,948	96,941	1,516,032	1,009,056	269,008	199,915	548,600	431,148	-	4,070,700	3,615,248	1,084,554	2,530,695	632,674	632,674	1,265,347
2003	7,970,849	96,941	1,614,574	1,044,668	278,980	212,910	548,600	344,919	-	4,141,591	3,829,258	1,157,317	2,671,941	667,985	667,985	1,335,971
2004	8,273,688	96,941	1,719,521	1,082,523	289,579	226,749	548,600	258,689	-	4,222,602	4,051,086	1,232,739	2,818,347	704,587	704,587	1,409,174
2005	8,595,613	96,941	1,831,290	1,122,764	300,846	241,487	548,600	172,459	-	4,314,388	4,281,226	1,310,986	2,970,240	742,560	742,560	1,485,120
2006	8,937,848	96,941	1,950,324	1,165,543	312,825	257,184	548,600	86,230	-	4,417,646	4,520,202	1,723,393	2,796,809	699,202	699,202	1,398,405
2007	9,301,694	96,941	2,077,095	1,211,024	325,559	273,901	548,600	-	-	4,533,120	4,768,574	1,807,839	2,960,735	740,184	740,184	1,480,367
2008	9,688,536	96,941	2,212,106	1,259,379	339,099	291,705	548,600	-	-	4,747,829	4,940,707	1,866,364	3,074,343	768,586	768,586	1,537,171
2009	10,099,851	96,941	2,355,893	1,310,794	353,495	310,665	548,600	-	-	4,976,387	5,123,463	1,928,502	3,194,962	798,740	798,740	1,597,481
2010	10,537,207	96,941	2,509,026	1,365,463	368,802	330,859	548,600	-	-	5,219,691	5,317,517	1,994,480	3,323,037	830,759	830,759	1,661,518
2011	11,002,278	96,941	2,672,112	1,423,597	385,080	352,365	548,600	-	-	5,478,694	5,523,583	2,064,542	3,459,041	864,760	864,760	1,729,521
2012	11,496,843	96,941	2,845,800	1,485,418	402,389	375,268	548,600	-	-	5,754,416	5,742,427	2,138,949	3,603,478	900,869	900,869	1,801,739
2013	12,022,797	96,941	3,030,777	1,551,162	420,798	399,661	548,600	-	-	6,047,938	5,974,859	2,217,976	3,756,883	939,221	939,221	1,878,442
2014	12,582,158	96,941	3,227,777	1,621,082	440,376	425,639	548,600	-	-	6,360,414	6,221,744	2,301,917	3,919,827	979,957	979,957	1,959,914
2015	13,177,074	96,941	3,437,583	1,695,447	461,198	453,305	548,600	-	-	6,693,073	6,484,002	2,391,085	4,092,917	1,023,229	1,023,229	2,046,459
2016	13,809,832	96,941	3,661,026	1,774,541	483,344	482,770	548,600	-	-	7,047,222	6,762,611	2,485,812	4,276,799	1,069,200	1,069,200	2,138,400
2017	14,482,867	96,941	3,898,992	1,858,671	506,900	514,150	548,600	-	-	7,424,254	7,058,613	2,586,452	4,472,161	1,118,040	1,118,040	2,236,080
2018	15,198,771	96,941	4,152,427	1,948,159	531,957	547,570	548,600	-	-	7,825,653	7,373,118	2,693,384	4,679,734	1,169,934	1,169,934	2,339,867
2019	15,960,304	96,941	4,422,334	2,043,350	558,611	583,162	548,600	-	-	8,252,998	7,707,306	2,807,008	4,900,298	1,225,075	1,225,075	2,450,149
2020	16,770,406	96,941	4,709,786	2,144,613	586,964	621,067	548,600	-	-	8,707,971	8,062,434	2,927,752	5,134,683	1,283,671	1,283,671	2,567,341

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
INCOME TAX REPORT

	INCOME DEF TAXES	BOOK DEPREC	TAX DEPREC	INT DURING CONSTR	TAXABLE INCOME	TAX LOSS CARRYFWD	CARRYFWD UTILIZED	ADJ TXBL INCOME	TAX RATE	INCOME TAXES
1990	-	-	-	-	-	-	-	-	.340	-
1991	1,614,119	548,600	1,665,800	-	516,919	-	-	516,919	.340	175,752
1992	1,777,024	548,600	1,481,220	-	844,404	-	-	844,404	.340	287,097
1993	1,942,322	548,600	1,333,098	-	1,157,824	-	-	1,157,824	.340	393,660
1994	2,108,653	548,600	1,199,788	-	1,457,465	-	-	1,457,465	.340	495,538
1995	2,277,892	548,600	1,079,809	-	1,746,682	-	-	1,746,682	.340	593,872
1996	2,451,932	548,600	971,845	-	2,028,687	-	-	2,028,687	.340	689,754
1997	2,634,296	548,600	973,984	-	2,208,911	-	-	2,208,911	.340	751,030
1998	2,818,859	548,600	973,984	-	2,393,475	-	-	2,393,475	.340	813,782
1999	3,009,185	548,600	973,984	-	2,583,801	-	-	2,583,801	.340	878,492
2000	3,205,635	548,600	973,984	-	2,780,250	-	-	2,780,250	.340	945,285
2001	3,408,593	548,600	973,984	-	2,983,208	-	-	2,983,208	.340	1,014,291
2002	3,615,248	548,600	973,984	-	3,189,864	-	-	3,189,864	.340	1,084,554
2003	3,829,258	548,600	973,984	-	3,403,874	-	-	3,403,874	.340	1,157,317
2004	4,051,086	548,600	973,984	-	3,625,702	-	-	3,625,702	.340	1,232,739
2005	4,281,226	548,600	973,984	-	3,855,841	-	-	3,855,841	.340	1,310,986
2006	4,520,202	548,600	-	-	5,068,802	-	-	5,068,802	.340	1,723,393
2007	4,768,574	548,600	-	-	5,317,174	-	-	5,317,174	.340	1,807,839
2008	4,940,707	548,600	-	-	5,489,307	-	-	5,489,307	.340	1,866,364
2009	5,123,463	548,600	-	-	5,672,063	-	-	5,672,063	.340	1,928,302
2010	5,317,317	548,600	-	-	5,866,117	-	-	5,866,117	.340	1,994,480
2011	5,523,583	548,600	-	-	6,072,183	-	-	6,072,183	.340	2,064,542
2012	5,742,427	548,600	-	-	6,291,027	-	-	6,291,027	.340	2,138,949
2013	5,974,859	548,600	-	-	6,523,459	-	-	6,523,459	.340	2,217,976
2014	6,221,744	548,600	-	-	6,770,344	-	-	6,770,344	.340	2,301,917
2015	6,484,002	548,600	-	-	7,032,602	-	-	7,032,602	.340	2,391,085
2016	6,762,611	548,600	-	-	7,311,211	-	-	7,311,211	.340	2,485,812
2017	7,058,613	548,600	-	-	7,607,213	-	-	7,607,213	.340	2,586,452
2018	7,373,118	548,600	-	-	7,921,718	-	-	7,921,718	.340	2,693,384
2019	7,707,306	548,600	-	-	8,255,906	-	-	8,255,906	.340	2,807,008
2020	8,062,434	548,600	-	-	8,611,034	-	-	8,611,034	.340	2,927,752

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
ECONOMIC CASH FLOWS STATEMENT

	NET INCOME	INTEREST EXPENSE	INTEREST TAX SAV	BOOK DEPREC	ESCROW CASH FLOW	CAPITAL EXPEND	CHANGE IN WKG CAP	MISC CASH FLOWS	NET CASH FLOW
1990	-	-	-	-	-	-16,458,000	-200,000	-	-16,658,000
1991	1,438,366	1,379,674	-469,089	548,600	-	-	-131,420	-	2,766,131
1992	1,489,926	1,293,445	-439,771	548,600	-	-	-22,608	-	2,869,592
1993	1,548,662	1,207,215	-410,453	548,600	-	-	-22,847	-	2,871,177
1994	1,613,115	1,120,985	-381,135	548,600	-	-	-23,340	-	2,878,225
1995	1,684,020	1,034,756	-351,817	548,600	-	-	-23,818	-	2,891,741
1996	1,762,179	948,526	-322,499	548,600	-	-	-24,277	-	2,912,528
1997	1,883,266	862,296	-293,181	548,600	-	-	-20,365	-	2,980,617
1998	2,005,078	776,067	-263,863	548,600	-	-	-21,820	-	3,044,062
1999	2,130,693	689,837	-234,545	548,600	-	-	-22,990	-	3,111,596
2000	2,260,350	603,608	-205,227	548,600	-	-	-24,234	-	3,183,096
2001	2,394,302	517,378	-175,908	548,600	-	-	-25,559	-	3,258,812
2002	2,530,695	431,148	-146,590	548,600	-	-	-27,235	-	3,336,618
2003	2,671,941	344,919	-117,272	548,600	-	-	-28,736	-	3,419,452
2004	2,818,347	258,689	-87,954	548,600	-	-	-30,333	-	3,507,349
2005	2,970,240	172,459	-58,636	548,600	-	-	-32,033	-	3,600,630
2006	2,796,809	86,230	-29,318	548,600	-	-	-75,237	-	3,327,084
2007	2,960,735	-	-	548,600	-	-	-35,769	-	3,473,566
2008	3,074,343	-	-	548,600	-	-	-34,154	-	3,588,788
2009	3,194,962	-	-	548,600	-	-	-36,337	-	3,707,225
2010	3,323,037	-	-	548,600	-	-	-38,660	-	3,832,977
2011	3,459,041	-	-	548,600	-	-	-41,133	-	3,966,508
2012	3,603,478	-	-	548,600	-	-	-43,766	-	4,108,312
2013	3,756,883	-	-	548,600	-	-	-46,569	-	4,258,914
2014	3,919,827	-	-	548,600	-	-	-49,552	-	4,418,875
2015	4,092,917	-	-	548,600	-	-	-52,728	-	4,588,789
2016	4,276,799	-	-	548,600	-	-	-56,110	-	4,769,290
2017	4,472,161	-	-	548,600	-	-	-59,709	-	4,961,052
2018	4,679,734	-	-	548,600	-	-	-63,541	-	5,164,793
2019	4,900,298	-	-	548,600	-	-	-67,621	-	5,381,277
2020	5,134,683	-	-	548,600	-	-	-71,965	-	5,611,318

DISCOUNT RATE	10.00%
INTERNAL RATE OF RETURN	18.07%
NET PRESENT VALUE	13,687,373

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
SOURCES AND USES OF FUNDS STATEMENT

	NET INCOME	BOOK DEPREC	INT DURING CONSTR	CAPITAL CONTRIB	DEBT FINANCING	TOTAL SOURCES	DEBT REPAYMENTS	CAPITAL DISTRIB	CHANGE IN ESCROW	CHANGE IN WKG CAP	CAPITAL EXPEND	INT DURING CONSTR	MISC FUND USES	TOTAL FUND USES
1990	-	-	-	3,331,600	13,326,400	16,658,000	-	-	-	200,000	16,458,000	-	-	16,658,000
1991	1,438,366	548,600	-	-	-	1,986,966	783,906	1,071,640	-	131,420	-	-	-	1,986,966
1992	1,489,926	548,600	-	-	-	2,038,526	783,906	1,232,012	-	22,608	-	-	-	2,038,526
1993	1,548,662	548,600	-	-	-	2,097,262	783,906	1,290,509	-	22,847	-	-	-	2,097,262
1994	1,613,115	548,600	-	-	-	2,161,715	783,906	1,354,469	-	23,340	-	-	-	2,161,715
1995	1,684,020	548,600	-	-	-	2,232,620	783,906	1,424,896	-	23,818	-	-	-	2,232,620
1996	1,762,179	548,600	-	-	-	2,310,779	783,906	1,502,595	-	24,277	-	-	-	2,310,779
1997	1,883,266	548,600	-	-	-	2,431,866	783,906	1,627,595	-	20,365	-	-	-	2,431,866
1998	2,005,078	548,600	-	-	-	2,553,678	783,906	1,747,952	-	21,820	-	-	-	2,553,678
1999	2,130,693	548,600	-	-	-	2,679,293	783,906	1,872,397	-	22,990	-	-	-	2,679,293
2000	2,260,350	548,600	-	-	-	2,808,950	783,906	2,000,809	-	24,234	-	-	-	2,808,950
2001	2,394,302	548,600	-	-	-	2,942,902	783,906	2,133,437	-	25,559	-	-	-	2,942,902
2002	2,530,695	548,600	-	-	-	3,079,295	783,906	2,268,154	-	27,235	-	-	-	3,079,295
2003	2,671,941	548,600	-	-	-	3,220,541	783,906	2,407,900	-	28,736	-	-	-	3,220,541
2004	2,818,347	548,600	-	-	-	3,366,947	783,906	2,552,709	-	30,333	-	-	-	3,366,947
2005	2,970,240	548,600	-	-	-	3,518,840	783,906	2,702,901	-	32,033	-	-	-	3,518,840
2006	2,796,809	548,600	-	-	-	3,345,409	783,906	2,486,267	-	75,237	-	-	-	3,345,409
2007	2,960,735	548,600	-	-	-	3,509,335	783,906	2,689,660	-	35,769	-	-	-	3,509,335
2008	3,074,343	548,600	-	-	-	3,622,943	-	3,588,788	-	34,154	-	-	-	3,622,943
2009	3,196,962	548,600	-	-	-	3,743,562	-	3,707,225	-	36,337	-	-	-	3,743,562
2010	3,323,037	548,600	-	-	-	3,871,637	-	3,832,977	-	38,660	-	-	-	3,871,637
2011	3,459,041	548,600	-	-	-	4,007,641	-	3,966,508	-	41,133	-	-	-	4,007,641
2012	3,603,478	548,600	-	-	-	4,152,078	-	4,108,312	-	43,766	-	-	-	4,152,078
2013	3,756,883	548,600	-	-	-	4,305,483	-	4,258,914	-	46,569	-	-	-	4,305,483
2014	3,919,827	548,600	-	-	-	4,468,427	-	4,418,875	-	49,552	-	-	-	4,468,427
2015	4,092,917	548,600	-	-	-	4,641,517	-	4,588,789	-	52,728	-	-	-	4,641,517
2016	4,276,799	548,600	-	-	-	4,825,399	-	4,769,290	-	56,110	-	-	-	4,825,399
2017	4,472,161	548,600	-	-	-	5,020,761	-	4,961,052	-	59,709	-	-	-	5,020,761
2018	4,679,734	548,600	-	-	-	5,228,334	-	5,164,793	-	63,541	-	-	-	5,228,334
2019	4,900,298	548,600	-	-	-	5,448,898	-	5,381,277	-	67,621	-	-	-	5,448,898
2020	5,134,683	548,600	-	-	-	5,683,283	-	5,611,318	-	71,965	-	-	-	5,683,283

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
WASTE-TO-ENERGY FACILITY
BALANCE SHEET REPORT

	PLANT	ACCUM DEPR	CONSTR WK IN PRG	WORKING CAPITAL	ESCROW BALANCE	TOTAL ASSETS	DEBT	EQUITY	OTHER LIAB	TOTAL LIAB	% DEBT	% EQUITY	DEBT SERVICE COVERAGE	RETURN ON INVESTMNT	RETURN ON EQUITY	INTEREST COVERAGE
1990	-	-	16,458,000	200,000	-	16,658,000	13,326,400	3,331,600	-	16,658,000	80.00	20.00	-	-	-	-
1991	16,458,000	-548,600	-	331,420	-	16,240,820	12,542,494	3,698,326	-	16,240,820	77.23	22.77	1.38	17.35	38.89	2.17
1992	16,458,000	-1,097,200	-	354,028	-	15,714,828	11,758,588	3,956,240	-	15,714,828	74.82	25.18	1.48	17.71	37.66	2.37
1993	16,458,000	-1,645,800	-	376,875	-	15,189,075	10,974,682	4,214,393	-	15,189,075	72.25	27.75	1.58	18.14	36.75	2.61
1994	16,458,000	-2,194,400	-	400,215	-	14,663,815	10,190,776	4,473,038	-	14,663,815	69.50	30.50	1.70	18.65	36.06	2.88
1995	16,458,000	-2,743,000	-	424,032	-	14,139,032	9,406,871	4,732,162	-	14,139,032	66.53	33.47	1.82	19.23	35.59	3.20
1996	16,458,000	-3,291,600	-	448,310	-	13,614,710	8,622,965	4,991,745	-	13,614,710	63.34	36.66	1.96	19.91	35.30	3.58
1997	16,458,000	-3,840,200	-	468,674	-	13,086,474	7,839,059	5,247,416	-	13,086,474	59.90	40.10	2.12	20.98	35.89	4.05
1998	16,458,000	-4,388,800	-	490,495	-	12,559,695	7,055,153	5,504,542	-	12,559,695	56.17	43.83	2.30	22.14	36.43	4.63
1999	16,458,000	-4,937,400	-	513,485	-	12,034,085	6,271,247	5,762,838	-	12,034,085	52.11	47.89	2.51	23.44	36.97	5.36
2000	16,458,000	-5,486,000	-	537,719	-	11,509,719	5,487,341	6,022,378	-	11,509,719	47.68	52.32	2.75	24.88	37.53	6.31
2001	16,458,000	-6,034,600	-	563,278	-	10,986,678	4,703,435	6,283,243	-	10,986,678	42.81	57.19	3.02	26.50	38.11	7.59
2002	16,458,000	-6,583,200	-	590,513	-	10,465,313	3,919,529	6,545,784	-	10,465,313	37.45	62.55	3.33	28.30	38.66	9.39
2003	16,458,000	-7,131,800	-	619,249	-	9,945,449	3,135,624	6,809,825	-	9,945,449	31.53	68.47	3.70	30.33	39.24	12.10
2004	16,458,000	-7,680,400	-	649,581	-	9,427,181	2,351,718	7,075,464	-	9,427,181	24.95	75.05	4.13	32.64	39.83	16.66
2005	16,458,000	-8,229,000	-	681,614	-	8,910,614	1,567,812	7,342,803	-	8,910,614	17.59	82.41	4.66	35.27	40.45	25.82
2006	16,458,000	-8,777,600	-	716,851	-	8,437,251	783,906	7,653,345	-	8,437,251	9.29	90.71	5.29	34.17	36.54	53.42
2007	16,458,000	-9,326,200	-	792,620	-	7,924,420	-	7,924,420	-	7,924,420	-	100.00	6.08	37.36	37.36	-
2008	16,458,000	-9,874,800	-	826,774	-	7,409,974	-	7,409,974	-	7,409,974	-	100.00	-	41.49	41.49	-
2009	16,458,000	-10,423,400	-	863,111	-	6,897,711	-	6,897,711	-	6,897,711	-	100.00	-	46.32	46.32	-
2010	16,458,000	-10,972,000	-	901,771	-	6,387,771	-	6,387,771	-	6,387,771	-	100.00	-	52.02	52.02	-
2011	16,458,000	-11,520,600	-	942,905	-	5,880,305	-	5,880,305	-	5,880,305	-	100.00	-	58.82	58.82	-
2012	16,458,000	-12,069,200	-	986,671	-	5,375,471	-	5,375,471	-	5,375,471	-	100.00	-	67.04	67.04	-
2013	16,458,000	-12,617,800	-	1,033,239	-	4,873,439	-	4,873,439	-	4,873,439	-	100.00	-	77.09	77.09	-
2014	16,458,000	-13,166,400	-	1,082,791	-	4,374,391	-	4,374,391	-	4,374,391	-	100.00	-	89.61	89.61	-
2015	16,458,000	-13,715,000	-	1,135,520	-	3,878,520	-	3,878,520	-	3,878,520	-	100.00	-	105.53	105.53	-
2016	16,458,000	-14,263,600	-	1,191,629	-	3,386,029	-	3,386,029	-	3,386,029	-	100.00	-	126.31	126.31	-
2017	16,458,000	-14,812,200	-	1,251,338	-	2,897,138	-	2,897,138	-	2,897,138	-	100.00	-	154.36	154.36	-
2018	16,458,000	-15,360,800	-	1,314,880	-	2,412,080	-	2,412,080	-	2,412,080	-	100.00	-	194.01	194.01	-
2019	16,458,000	-15,909,400	-	1,382,501	-	1,931,101	-	1,931,101	-	1,931,101	-	100.00	-	253.76	253.76	-
2020	16,458,000	-16,458,000	-	1,454,465	-	1,454,465	-	1,454,465	-	1,454,465	-	100.00	-	353.03	353.03	-

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SUMMARY SCHEDULE OF ALTERNATIVES
SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY
COMPARISON OF TIPPING FEES
(EXPRESSED IN $ PER TON)

	SOCIA ALTERNATIVES			
YEAR	(1) WITHOUT WASTE TO ENERGY	(2) WITH WASTE TO ENERGY	(3) WITH WASTE TO ENERGY	(4) OAKLAND COUNTY PROPOSAL
1991	$41.03	$42.13	$32.30	$0.00
1992	42.13	41.87	33.20	0.00
1993	43.37	41.70	34.17	44.28
1994	44.53	41.82	35.23	47.17
1995	44.65	41.16	36.38	48.70
1996	45.72	41.42	37.63	50.34
1997	47.05	41.90	38.97	52.10
1998	48.43	42.40	40.43	53.98
1999	49.46	42.51	42.00	55.99
2000	50.98	43.80	43.69	58.14
2001	52.57	43.67	45.52	60.45
2002	54.22	45.11	47.51	62.91
2003	55.93	44.93	49.62	65.55
2004	57.71	45.58	51.91	68.38
2005	59.56	46.25	54.38	71.41
2006	61.50	46.95	57.03	74.85
2007	63.50	47.67	59.87	78.11
2008	65.59	48.41	63.11	81.83
2009	67.76	48.17	66.59	85.81
2010	70.01	49.95	70.31	90.08
2011	61.00	28.20	55.44	94.61
2012	63.44	29.19	59.69	57.83
2013	65.98	30.18	64.23	
2014	68.62	31.19	69.09	
2015	71.36	32.22	74.28	
2016	74.21	33.74	79.83	
2017	77.18	36.11	85.77	
2018	80.27	38.97	92.11	
2019	83.48	42.14	98.80	
2020	86.83	45.66	106.15	

NOTE: The County proposal provides that the agreement with Detroit Edison is only for a period of 20 years.

1. Based on assumptions setforth in Schedule 1, dated 01/05/89

2. Based on assumptions setforth in Schedules 2 and 2A, dated 01/05/89.

3. Based on assumptions setforth in Schedules 2C and 2AC, dated 05/03/89.

4. From Oakland County's Pro Forma Tipping Fee Projections for the Westinghouse Corporation.

RCB
05/04/89
SOCIA7C

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SCHEDULE 1

SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY

SCHEDULE OF TIPPING FEE REQUIREMENTS FOR OPERATION, MAINTENANCE AND DEBT SERVICE WITHOUT WTE

YEAR	(1) SYSTEM OPERATING & MAINTENANCE COSTS	SYSTEM O & M COST PER TON (2)	ANNUAL EQUIPT. REPLACE (3)	EQUIPT REPLACE. COST PER TON (2)	DEBT SERVICE ON EXISTING BONDS	EXISTING DEBT COST PER TON (2)	DEBT SERVICE ON A $23,000,000 BOND ISSUE (4)	PROPOSED DEBT COST PER TON (5)	TOTAL SYSTEM COST PER TON
1991	$6,213,250	$26.44	$329,000	$1.40	$429,320	$1.83	$2,500,000	$11.36	$41.03
1992	6,461,780	27.50	342,160	1.46	426,433	1.81	2,500,000	11.36	42.13
1993	6,720,251	28.60	355,846	1.51	447,615	1.90	2,500,000	11.36	43.37
1994	6,989,061	29.74	370,080	1.57	436,255	1.86	2,500,000	11.36	44.53
1995	7,268,623	30.93	384,883	1.64	168,582	0.72	2,500,000	11.36	44.65
1996	7,559,368	32.17	400,278	1.70	114,700	0.49	2,500,000	11.36	45.72
1997	7,861,743	33.45	416,289	1.77	109,350	0.47	2,500,000	11.36	47.05
1998	8,176,213	34.79	432,941	1.84	104,000	0.44	2,500,000	11.36	48.43
1999	8,503,262	36.18	450,259	1.92			2,500,000	11.36	49.46
2000	8,843,392	37.63	468,269	1.99			2,500,000	11.36	50.98
2001	9,197,128	39.14	487,000	2.07			2,500,000	11.36	52.57
2002	9,565,013	40.70	506,480	2.16			2,500,000	11.36	54.22
2003	9,947,614	42.33	526,739	2.24			2,500,000	11.36	55.93
2004	10,345,519	44.02	547,809	2.33			2,500,000	11.36	57.71
2005	10,759,340	45.78	569,721	2.42			2,500,000	11.36	59.56
2006	11,189,714	47.62	592,510	2.52			2,500,000	11.36	61.50
2007	11,637,303	49.52	616,210	2.62			2,500,000	11.36	63.50
2008	12,102,795	51.50	640,858	2.73			2,500,000	11.36	65.59
2009	12,586,907	53.56	666,492	2.84			2,500,000	11.36	67.76
2010	13,090,383	55.70	693,152	2.95			2,500,000	11.36	70.01
2011	13,613,998	57.93	720,878	3.07				0.00	61.00
2012	14,158,558	60.25	749,713	3.19				0.00	63.44
2013	14,724,900	62.66	779,702	3.32				0.00	65.98
2014	15,313,896	65.17	810,890	3.45				0.00	68.62
2015	15,926,452	67.77	843,326	3.59				0.00	71.36
2016	16,563,510	70.48	877,059	3.73				0.00	74.21
2017	17,226,050	73.30	912,141	3.88				0.00	77.18
2018	17,915,092	76.23	948,627	4.04				0.00	80.27
2019	18,631,696	79.28	986,572	4.20				0.00	83.48
2020	19,376,964	82.46	1,026,035	4.37				0.00	86.83

(1) From the 1989 SOCIA Budget adjusted to reflect revised incineation costs with an inflation rate of 4% per year.

(2) Based on billable tonnage of 235,000.

(3) Based on budget of $329,000 with inflation at the rate of 4% annually.

(4) Based on bond issues as follows:

Purpose	Size	Interest Rate	Years	Annual Debt Service
Air Pollution Equip.	$15,000,000	8 1/2%	20	$1,650,000
Landfill costs	8,000,000	8 1/2	20	850,000
				$2,500,000

(5) Based on level debt service tables and an annual tonnage of 220,000 that is subject to the debt service charge.

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SCHEDULE 2
SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY

SCHEDULE OF CASH FLOW AND DEBT SERVICE REQUIREMENTS FOR THE WTE ALTERNATIVE
ASSUMING THE CONTINUED OPERATION OF THE LANDFILL BY SOCIA

YEAR	(1) INCOME BEFORE TAXES	LESS PRINCIPAL ON BONDS	ADD BOOK DEPR.	ADJUSTED INCOME BEFORE TAXES	SOCIA SHARE OF JOINT VENTURE SOR	ADD THERMAL ENERGY SALES TO VENTURE	NET CASH FLOW TO SOCIA	(2) DEBT SERVICE REQUIREMENTS	AMOUNT REQUIRED FROM TIPPING FEE (3)
1991	$805,176	$666,320	$548,600	$687,456	$343,728	$615,717	$959,445	$4,660,000	($3,700,555)
1992	1,170,353	666,320	548,600	1,052,633	526,317	692,682	1,218,999	4,660,000	($3,441,001)
1993	1,546,685	666,320	548,600	1,428,965	714,483	775,804	1,490,287	4,660,000	($3,169,713)
1994	1,801,831	666,320	548,600	1,684,111	842,056	834,959	1,677,015	4,660,000	($2,982,985)
1995	1,975,472	666,320	548,600	1,857,752	928,876	876,707	1,805,583	4,660,000	($2,854,417)
1996	2,155,200	666,320	548,600	2,037,480	1,018,740	920,542	1,939,282	4,660,000	($2,720,718)
1997	2,344,650	666,320	548,600	2,226,930	1,113,465	966,569	2,080,034	4,660,000	($2,579,966)
1998	2,537,823	666,320	548,600	2,420,103	1,210,052	1,014,898	2,224,950	4,660,000	($2,435,050)
1999	2,738,416	666,320	548,600	2,620,696	1,310,348	1,065,643	2,375,991	4,660,000	($2,284,009)
2000	2,946,937	666,320	548,600	2,829,217	1,414,609	1,118,925	2,533,534	4,660,000	($2,126,466)
2001	3,163,933	666,320	548,600	3,046,213	1,523,107	1,174,871	2,697,978	4,660,000	($1,962,022)
2002	3,386,770	666,320	548,600	3,269,050	1,634,525	1,233,615	2,868,140	4,660,000	($1,791,860)
2003	3,619,296	666,320	548,600	3,501,576	1,750,788	1,295,295	3,046,083	4,660,000	($1,613,917)
2004	3,862,187	666,320	548,600	3,744,467	1,872,234	1,360,060	3,232,294	4,660,000	($1,427,706)
2005	4,116,167	666,320	548,600	3,998,447	1,999,224	1,428,063	3,427,287	4,660,000	($1,232,713)
2006	4,382,011	666,320	548,600	4,264,291	2,132,146	1,499,466	3,631,612	4,660,000	($1,028,388)
2007	4,660,555	666,320	548,600	4,542,835	2,271,418	1,574,439	3,845,857	4,660,000	($814,143)
2008	4,952,693	666,320	548,600	4,834,973	2,417,487	1,653,161	4,070,648	4,660,000	($589,352)
2009	5,259,388	666,320	548,600	5,141,668	2,570,834	1,735,820	4,306,654	4,660,000	($353,346)
2010	5,581,671	666,320	548,600	5,463,951	2,731,976	1,822,610	4,554,586	4,660,000	($105,414)
2011	5,847,356		548,600	6,395,956	3,197,978	1,913,741	5,111,719		5,111,719
2012	6,130,931		548,600	6,679,531	3,339,766	2,009,428	5,349,194		5,349,194
2013	6,433,673		548,600	6,982,273	3,491,137	2,109,899	5,601,036		5,601,036
2014	6,756,960		548,600	7,305,560	3,652,780	2,215,394	5,868,174		5,868,174
2015	7,102,268		548,600	7,650,868	3,825,434	2,326,164	6,151,598		6,151,598
2016	7,255,260		548,600	7,803,860	3,901,930	2,442,472	6,344,402		6,344,402
2017	7,071,355		548,600	7,619,955	3,809,978	2,564,596	6,374,574		6,374,574
2018	6,703,961		548,600	7,252,561	3,626,281	2,692,826	6,319,107		6,319,107
2019	6,229,328		548,600	6,777,928	3,388,964	2,827,467	6,216,431		6,216,431
2020	5,639,883		548,600	6,188,483	3,094,242	2,968,840	6,063,082		6,063,082

(1) From the Income Statement included in the Joint Venture Feasibility Study.

(2) Based on bond issues as follows:

Purpose	Size	Interest Rate	Years	Annual Debt Service
Socia Improve.	$33,500,000	8 1/2%	20	$3,600,000
Landfill Costs	8,000,000	8 1/2%	20	850,000
Socia share of Equity in Venture	1,650,000	11%	20	210,000
				$4,660,000

The above debt service requirements are based on level debt tables.

(3) Based on an annual tonnage of 220,000 that is subject to the debt service charge. Figures in ( ) require additional tipping fee.

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SCHEDULE 2A

SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY

SCHEDULE OF TIPPING FEE REQUIREMENTS FOR OPERATION, MAINTENANCE AND DEBT SERVICE BASED ON SCHEDULE 2

YEAR	(1) SYSTEM OPERATING & MAINTENANCE COSTS	SYSTEM O & M COST PER TON (2)	ANNUAL EQUIPT. REPLACE (3)	EQUIPT REPLACE. COST PER TON (2)	DEBT SERVICE ON EXISTING BONDS	EXISTING DEBT COST PER TON (2)	SOCIA AMOUNT REQUIRED FROM SCHEDULE 2	PROPOSED DEBT COST PER TON (4)	TOTAL SYSTEM COST PER TON
1991	$5,188,000	$22.08	$329,000	$1.40	$429,320	$1.83	$3,700,555	$16.82	$42.13
1992	5,395,520	22.96	342,160	1.46	426,433	1.81	3,441,001	15.64	41.87
1993	5,611,341	23.88	355,846	1.51	447,615	1.90	3,169,713	14.41	41.70
1994	5,835,795	24.83	370,080	1.57	436,255	1.86	2,982,985	13.56	41.82
1995	6,069,227	25.83	384,883	1.64	168,582	0.72	2,854,417	12.97	41.16
1996	6,311,996	26.86	400,278	1.70	114,700	0.49	2,720,718	12.37	41.42
1997	6,564,476	27.93	416,289	1.77	109,350	0.47	2,579,966	11.73	41.90
1998	6,827,055	29.05	432,941	1.84	104,000	0.44	2,435,050	11.07	42.40
1999	7,100,137	30.21	450,259	1.92			2,284,009	10.38	42.51
2000	7,384,142	31.42	468,269	1.99			2,126,666	9.67	43.08
2001	7,679,508	32.64	487,000	2.07			1,962,022	8.92	43.67
2002	7,986,688	33.99	506,480	2.16			1,971,860	8.96	45.11
2003	8,306,156	35.35	526,739	2.24			1,613,917	7.34	44.93
2004	8,638,402	36.76	547,809	2.33			1,427,706	6.49	45.58
2005	8,983,938	38.23	569,721	2.42			1,232,713	5.60	46.25
2006	9,343,296	39.76	592,510	2.52			1,028,388	4.67	46.95
2007	9,717,028	41.35	616,210	2.62			816,143	3.70	47.67
2008	10,105,709	43.00	640,858	2.73			589,352	2.68	48.41
2009	10,509,937	44.72	666,492	2.84			353,346	1.61	49.17
2010	10,930,334	46.51	693,152	2.95			105,414	0.48	49.94
2011	11,367,547	48.37	720,878	3.07			(5,111,719)	(23.24)	28.20
2012	11,822,249	50.31	749,713	3.19			(5,349,194)	(24.31)	29.19
2013	12,295,139	52.32	779,702	3.32			(5,601,036)	(25.46)	30.18
2014	12,786,945	54.41	810,890	3.45			(5,868,174)	(26.67)	31.19
2015	13,298,423	56.59	843,326	3.59			(6,151,598)	(27.96)	32.22
2016	13,830,360	58.85	877,059	3.73			(6,344,402)	(28.84)	33.74
2017	14,383,574	61.21	912,141	3.88			(6,376,574)	(28.98)	36.11
2018	14,958,917	63.65	948,627	4.04			(6,319,107)	(28.72)	38.97
2019	15,557,274	66.20	986,572	4.20			(6,216,631)	(28.26)	42.14
2020	16,179,565	68.85	1,026,035	4.37			(6,063,082)	(27.56)	45.66

(1) From the 1989 SOCIA Budget adjusted to reflect revised incineration costs with an inflation rate of 4% per year.

(2) Based on billable tonnage of 235,000.

(3) Based on budget of $329,000 with inflation at the rate of 4% annually.

(4) Based on an annual tonnage of 220,000 that is subject to the debt service charge.

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SCHEDULE 2AC

SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY

SCHEDULE OF TIPPING FEE REQUIREMENTS FOR OPERATION, MAINTENANCE AND DEBT SERVICE BASED ON SCHEDULE 2C

YEAR	(1) SYSTEM OPERATING & MAINTENANCE COSTS	SYSTEM O & M COST PER TON (2)	ANNUAL EQUIPT. REPLACE (3)	EQUIPT REPLACE. COST PER TON (2)	DEBT SERVICE ON EXISTING BONDS	EXISTING DEBT COST PER TON (2)	SOCIA AMOUNT REQUIRED FROM SCHEDULE 2C	PROPOSED DEBT COST PER TON (4)	TOTAL SYSTEM COST PER TON
1991	$4,802,200	$20.43	$329,000	$1.40	$0	$0.00	$2,303,462	$10.47	$32.30
1992	5,128,750	21.82	351,372	1.50	0	0.00	2,172,719	9.88	33.20
1993	5,477,505	23.31	375,265	1.60	0	0.00	2,037,574	9.26	34.17
1994	5,849,975	24.89	400,783	1.71	0	0.00	1,898,499	8.63	35.23
1995	6,247,773	26.59	428,036	1.82	0	0.00	1,754,338	7.97	36.38
1996	6,672,622	28.39	457,142	1.95	0	0.00	1,603,906	7.29	37.63
1997	7,126,360	30.32	488,228	2.08	0	0.00	1,445,190	6.57	38.97
1998	7,610,952	32.39	521,428	2.22	0	0.00	1,280,984	5.82	40.43
1999	8,128,497	34.59	556,885	2.37			1,109,222	5.04	42.00
2000	8,681,235	36.94	594,753	2.53			929,619	4.22	43.69
2001	9,271,559	39.45	635,196	2.70			741,059	3.37	45.52
2002	9,902,025	42.14	678,389	2.89			545,204	2.48	47.51
2003	10,575,363	45.00	724,519	3.08			339,657	1.54	49.62
2004	11,294,488	48.06	773,786	3.29			123,796	0.56	51.91
2005	12,062,513	51.33	826,403	3.52			(103,043)	(0.47)	54.38
2006	12,882,764	54.82	882,598	3.76			(341,565)	(1.55)	57.03
2007	13,758,792	58.55	942,615	4.01			(592,522)	(2.69)	59.87
2008	14,694,390	62.53	1,006,713	4.28			(813,600)	(3.70)	63.11
2009	15,693,609	66.78	1,075,169	4.58			(1,048,765)	(4.77)	66.59
2010	16,760,774	71.32	1,148,280	4.89			(1,298,925)	(5.90)	70.31
2011	17,900,507	76.17	1,226,363	5.22			(5,708,204)	(25.95)	55.44
2012	19,117,741	81.35	1,309,756	5.57			(5,991,514)	(27.23)	59.69
2013	20,417,747	86.88	1,398,819	5.95			(6,292,507)	(28.60)	64.23
2014	21,806,154	92.79	1,493,939	6.36			(6,612,949)	(30.06)	69.09
2015	23,288,972	99.10	1,595,527	6.79			(6,953,884)	(31.61)	74.28
2016	24,872,622	105.84	1,704,023	7.25			(7,316,632)	(33.26)	79.83
2017	26,563,960	113.04	1,819,897	7.74			(7,702,599)	(35.01)	85.77
2018	28,370,309	120.72	1,943,650	8.27			(8,113,286)	(36.88)	92.11
2019	30,299,490	128.93	2,075,818	8.83			(8,550,287)	(38.86)	98.90
2020	32,359,855	137.70	2,216,974	9.43			(9,015,303)	(40.98)	106.15

(1) From the 1989 SOCIA Budget adjusted to reflect revised incineration costs with an inflation rate of 6.8% per year.

(2) Based on billable tonnage of 235,000.

(3) Based on budget of $329,000 with inflation at the rate of 6.8% annually.

(4) Based on an annual tonnage of 220,000 that is subject to the debt service charge.

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SOUTHEASTERN OAKLAND COUNTY INCINERATOR AUTHORITY (SOCIA)
Waste-to-Energy Facility

SUMMARY OF BASE CASE KEY ASSUMPTIONS

Parameter	Data
Facility and Project Term (expected life in years)	30
Quantity of Municipal solid waste (MSW) collected (tons/year)	233,000
Quantity of MSW incinerated (tons/year)	210,000
MSW heating value (Btu/lb)	5,000
Proposed facility operating hours (hrs/week)	168
Facility gross conversion efficiency (Btu/kWh)	17,500
Facility capacity factor (%, initial years, maturity)	70; 75; 80; 82 → 85
Gross generating capability (MW, maximum and typical)	17; 14
Transmission and transformer load loss (%)	1
Auxiliary power consumption at facility (%)	4
Escrow Payment Rate (cents/kWh)	~~0.5~~ 0
Capacity Payment Rate (cents/kWh)	3.1
Energy Payment Rate (on-peak and off, cents/kWh)	~~1.8~~ 2.0
O&M Payment Rate (cents/kWh)	0.4
Energy Escalation Rates (%)	~~5~~ 6.5
O&M Escalation Rates (%)	3
Total Project Capital Cost ($)	16,500,000
Financing Rate (%) and Required Down Payment (%)	11; 20
Financing Period (years)	~~20~~ 17
Service Escalation Rate (%)	~~5~~ 6.8
Tax depreciation period (years)	15
Thermal Energy Sale Rate (cents/MBtu)	39.9
General and Administrative Expense Rate (% of revenues)	3.5
Power Sales Contract Administrative Expense (¢/kWh)	0.1
Operations and Maintenance Expenses (% of revenues)	16.0
Insurance Fees ($/year)	100,000
Joint Venture Tax Rate (%)	34
Indirect Costs ($)	5,000,000

TABLE A

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APPENDIX C

SPECIFICATIONS FOR

COUNTY

MATERIAL RECOVERY FACILITY

(IN PART)

SCHEDULE 2
TECHNICAL SPECIFICATIONS

SECTION 1
GENERAL SPECIFICATIONS

1.1 GENERAL

The intent of these specifications is to set minimum guidelines and functional design requirements and to set minimum quality standards for design and construction of the Material Recovery Facility (MRF). There is no intent to limit the Contractor from adding to these minimum guidelines and requirements based upon research and development of its proprietary systems and subsystems.

Nothing in these specifications shall limit the Contractor's duty to comply with the Performance Guarantees or the other requirements of this Agreement not contained in Schedule 2.

1.2 GENERAL FACILITY CAPABILITY

The MRF shall be capable of processing paper and commingled recyclables delivered by private and municipal haulers, and producing industry specified feed stock. The commingled fraction shall consist of the following components:

- Aluminum - Cans made from aluminum, aluminum foil, aluminum wrappers, and aluminum containers or trays used in the packaging, preparation or cooking of foods.

- Ferrous Metal Containers - All food and beverage containers composed in whole of iron or steel and so called tin and bimetal cans.

- Glass Containers - All food and beverage jars and bottles, whole or broken, made from silica or sand, soda ash and limestone, the product being transparent or translucent. It is recognized that a degree of breakage will occur from handling glass (e.g., collection and tipping) prior to processing at the MRF.

- Plastic Containers - All food and beverage containers up to 2 gallons in size (inclusive) made from PET (polyethylene terephthalate) or natural (clear) HDPE, as well as pigmented HDPE (high density polyethylene) detergent and other bottles, exclusive of bottles containing hazardous material. It is recognized that changing packaging trends may allow the future inclusion of additional plastic packaging categories of PET and HDPE.

The paper fraction shall include the following components:

- Newspaper - All types of newsprint, newspaper advertisements, supplements, comics and enclosures.

- Cardboard/Corrugated Paper - All types of corrugated boxes, cardboard, cardboard cartons, and similar corrugated and kraft paper materials.

- Highgrade Paper - All types of white and colored ledger paper, note pads, loose-leaf fillers and computer paper discarded by businesses, offices and the like.

In general, the MRF shall consist of:

- An integrated system of mechanical equipment and physical processing capable of separating acceptable glass, metal and plastic containers into industry specified form.

- A process line or system for producing industry specified grades of paper and corrugated.

The process should be capable of but not limited to producing:

- Contaminant-free, furnace ready amber, green, and flint (clear) cullet.

- Industry acceptable mixed glass.

- Industry acceptable tin cans; tin cans shall mean those cans with a basic steel construction and an interior coating of tin.

- Industry-acceptable aluminum.

- Industry acceptable bi-metal cans; bi-metal cans shall mean those cans with side and bottom construction of steel, and with top construction of aluminum.

- Paper and corrugated in the form acceptable to dealers, brokers and mills.

- All plastics acceptable to the industry, as defined above.

The Contractor shall design or specify, furnish and install all conveyors, feeders, equipment, motors, controls and ancillaries necessary to separate, process, and prepare Recovered Materials for shipment to end markets or buyers. The objective of the processing systems shall be to maximize the recovery of material, and to minimize Rejected Material and Residual Material, consistent with cost-effective MRF operations. In addition, the processing system shall be rugged enough to withstand the impact of any Rejected Material, e.g., rock, rebar, pipe, tools, etc., which may inadvertantly be fed into the systems by the Contractor. Two separate processing and load out areas are required; (i) a metal, glass and plastic processing system and (ii) paper processing system. Each processing area shall be integrated with the appropriate tipping area. Processing systems shall be designed to be as automated as possible thereby minimizing hand sorting requirements if proven to be economically feasible.

APPENDIX D

ATTENDANCE LIST FOR SWPC MEETINGS / CITIZEN CONCERNS

ATTENDANCE LIST FOR SWPC MEETINGS

MEMBER/DATE	5/11/87	6/8/87	9/3/87	10/1/8	11/5/87	12/3/8	1/7/88	2/4/88	3/3/88	4/7/88	5/5/88	6/2/88	6/30/8	8/4/88	9/1/88
MADIAS,N.	X		X	X	X		X	X		X	X		X	X	X
BARETTA/RYAN, B.		X				X	X		X			X	X	X	X
BAKER, R.	X	X	X	X			X	X	X	X	X	X	X		X
RAUTH, M.	X		X	X		X		X	X			X			X
AMBER, J.*											X		X	X	X
KING, J.	X	X	X	X	X	X	X	X	X	X		X	X	X	X
SMITH, N.	X		X		X	X	X		X	X	X	X	X	X	X
MEENAHAN, J.	X			X	X	X	X	X	X	X	X	X	X	X	X
LAMERATO, J.	X		X		X	X	X	X	X	X	X	X	X	X	X
SECCOMBE, R.	X				X		X		X	X	X	X			X
PERINOFF/PERNICK				X		X	X	X	X		X	X			X
VANZILE/LEININGER/JADUN			X		X		X				X	X	X	X	X
VAN TASSEL/REGAN	X	X	X		X	X	X	X		X	X	X	X	X	X
BRUNETT/STARBUCK	X				X	X	X	X	X			X		X	X
NUMBER OF CITIZENS PRESENT**	22	11	19	12	17	15	12	16	20	35	35	9	15	15	31

*Jerome Amber was appointed as the 14th member in April 1988.

**Does not include SWPC members and staff. See minutes for attendance lists (only those who signed in are counted).

ATTENDANCE LIST FOR SWPC MEETINGS

MEMBER/DATE	10/13/88	12/1/88	2/2/89	5/4/89	5/18/89	6/1/89	6/20/89	9/28/89	11/2/89	11/8/89	11/30/89	12/7/89	4/5/90	4/25/90	5/10/90	6/14/90
MADIAS,N.			X		X	X		X	X	X	X	X	X	X	X	X
RYAN, B.					X	X		X	X	X	X	X	X			
BAKER, R.		X			X	X	X	X	X	X	X	X	X	X	X	X
RAUTH, M.	X		X			X		X	X	X	X	X				
AMBER, J.	X	X		X	X	X	X	X		X	X	X	X	X	X	X
KING, J.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SMITH, N.	X	X	X	X	X	X	X		X	X						
MEENAHAN, J.	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
LAMERATO, J.	X	X						X	X	X	X	X				
SECCOMBE, R.	X		X	X		X	X	X	X		X	X	X		X	X
PERINOFF/PERNICK	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
LEININGER/JADUN	X			X	X	X	X		X	X	X	X	X	X	X	X
VAN TASSEL/REGAN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
BRUNETT/STARBUCK	X	X	X	X	X	X	X		X		X	X		X	X	X
MOORE, M.S.													X	X	X	X
STINSON, D.													X	X	X	X
WAFFEN, T.													X	X	X	X
NUMBER OF CITIZENS PRESENT*	11	10	26	64	10	96	12	31	30	32	36	15	58	36	35	39

*Does not include SWPC members and staff. See minutes for attendance lists (only those who signed in are counted).
Note: M.S. Moore, D. Stinson, and T. Waffen were appointed to the SWPC in February 1990, replacing M. Rauth, N. Smith, and J. Lamerato.

CITIZENS' CONCERNS

Throughout the ongoing Plan Update process, including but not limited to the Public Hearing and the official period for public review and comment on the Plan Update, citizens expressed various concerns about different aspects of the proposed Plan Update. The following is a listing of those concerns and the recommendations of the Solid Waste Planning Committee (SWPC). Unless otherwise noted, the Board of Commissioners concurred with the SWPC recommendations.

MARLOWE/BFI LANDFILL

Concern: Residents and officials from the area affected by the proposed Marlowe/BFI Landfill expansion (Rose, Holly and Highland Townships) were concerned and opposed the expansion of the Marlowe/BFI Landfill. They cited the fact that this landfill is on the State 307 list as a contaminated site and that this proposed expansion could endanger the groundwater in the area as well as creating problems on the rural roads in this area due to the increased truck traffic. Residents were also concerned about the impact that such a landfill would have on their property values.

Response: The Solid Waste Planning Committee (SWPC) reviewed and evaluated the concerns expressed to them but elected to recommend that the proposed expansion of the Marlowe/BFI Landfill remain in the Plan Update.

The Board of Commissioners, however, deleted the Marlowe/BFI Landfill from the Plan Update for the following reason:

Oakland County is proposing to implement a system landfill after initial system contracted landfill capacity is utilized. If the BFI/Marlowe landfill continued to be designated in the Plan at that time, total landfill capacity in Oakland County will far exceed the county's 20 year needs, subjecting the county to the threat of substantial import of municipal solid wastes.

HOLLOWAY TYPE III LANDFILL IN NOVI

Concern: Residents of the area expressed concerns about the proposed construction of a Type III Landfill at Napier and Eight Mile Roads in Novi, the proposed landfill to be used by Holloway Sand & Gravel for the disposal of construction and demolition debris. Citizens were concerned about the impacts on the environment, property values, etc.

Response: The SWPC recommended removal of the Holloway Type III Landfill from the proposed Plan Update. That landfill together with the other landfills that were being proposed in the County would provide more capacity than the County needs to satisfy its 20 year landfill needs. That landfill would also be used only for Holloway's operation and would not be a facility that was open to the public. Therefore, the SWPC determined that was no need for the proposed facility and recommended that it be eliminated from the proposed Plan Update.

HOLLY DISPOSAL LANDFILL

Concern: Officials and residents of the Holly, Rose and Groveland Township area expressed concern with the inclusion of the Holly Disposal, Inc. Landfill in the Plan Update. They were concerned about the impacts on the environment, property values, water quality, etc.

Response: The SWPC considered that the capacity of the proposed Holly facility together with the capacity provided by other landfills proposed for the County Plan Update would provide more capacity than is required to meet the County's needs for a 20 year time frame. The Holly Disposal site is also far removed from the centers of waste generation of Oakland County. Therefore, the SWPC determined that was no need for the facility to satisfy County needs and recommended that the Holly Disposal Landfill be eliminated from the proposed Plan Update.

EAGLE VALLEY EXPANSION

Concern: Officials and residents of the Orion Township area were concerned about the expansion of the Eagle Valley Landfill. They were concerned about the impacts the expansion would have on the environment, property values, water quality, traffic, etc.

Response: The SWPC evaluated the concerns that were expressed to the Committee. The SWPC also considered the landfill capacity requirements of the County and the fact that the Eagle Valley Landfill is located close to the centers of waste generation. The Committee determined to recommend the expansion of the Eagle Valley Landfill.

WAYNE DISPOSAL-OAKLAND LANDFILL

Concern: Residents in Orion Township and Auburn Hills expressed concern with the continued operation of the Wayne Disposal-Oakland Landfill and the fact that there were so many waste disposal facilities in this area of the

County. They felt they had more than their share of waste disposal facilities and that the facilities should be scattered throughout the County.

Response: The SWPC considered the capacity provided by the Wayne Disposal-Oakland Landfill to satisfy the County's requirement and the need for landfill facilities and the fact that this was an operating landfill located near the centers of waste generation in the County. The Committee determined to continue to recommend the inclusion of the Wayne Disposal-Oakland Landfill in the County Plan Update.

WATERFORD HILLS LANDFILL

Concern: Citizens in the vicinity of the Waterford Hills Landfill objected to the continued operation and inclusion in the plan of the Waterford Hills Landfill. They objected to the blowing papers, the height of the landfill and the traffic caused by the operation of the landfill. They were also concerned about other environmental impacts that might result from the operation of the Waterford Hills facility. The operators of the Oakland-Pontiac Airport expressed concern about the height of the landfill endangering aircraft in the vicinity of the airport. They also pointed out that the landfill attracted seagulls and other birds which presented a very imminent danger to air traffic.

Response: The Solid Waste Planning Committee considered the concerns of the officials and the residents and also the landfill requirements of the County. The SWPC determined to recommend retention of the Waterford Hills Landfill in the County Plan Update and recommended that it be designated as a Type III Landfill to help deter the attraction of birds.

SOCRRA LANDFILL

Concern: Residents and officials from the City of Rochester Hills were concerned about the proposed expansion of the SOCRRA Landfill in Rochester Hills north of Avon Road. They were concerned about the impacts the proposed landfill would have on the adjacent mobile home park and on the Bloomer State Park located to the north and east. They expressed concerns about deterioration of the groundwater, odor problems, litter problems, impact on the enjoyment of recreational facilities and decrease in property values.

Response: The SWPC recommended continued inclusion of the proposed SOCRRA landfill expansion north of Avon Road in Rochester Hills. The expansion is to be used only as a covered ash monofill for waste-to-energy residue. The proposed landfill expansion would be used a monofill for disposal of ash form SOCRRA's waste-to-energy facility. This proposed ash depository is a vital part of SOCRRA's solid waste management planning. That landfill, together with the other landfills being proposed in the County, is necessary to provide the capacity for the entire County's 20-year landfill needs. SOCRRA has proposed measures to mitigate and/or eliminate impacts on the environment.

SOCRRA INCINERATOR IN MADISON HEIGHTS

Concern: Madison Heights residents and officials objected to the inclusion of the SOCRRA incinerator in Madison Heights in the County Plan Update. The incinerator is presently closed. SOCRRA proposes to retrofit the facility with air pollution control equipment meeting present day requirements and also to install electrical generating equipment. Electricity would be sold to Detroit Edison. Madison Heights residents and officials feel that the incinerator has caused and will continue to cause health problems and nuisance problems.

Response: The SWPC recommended that the refurbished SOCRRA incinerator located in Madison Heights be included in the Solid Waste Management Plan Update. That facility is necessary to the Solid Waste Management Plan for the SOCRRA communities. The facility will be designed, constructed and operated in accordance with the latest Act 641 rules and regulations and should present no threat to the environment.

THE LANDFILL SITING ADVISORY COMMITTEE

Concern: Residents of the Townships of Addison, Highland and Oxford, particularly, were concerned with the potential County landfills which had been located in those townships as a result of the Landfill Siting Advisory Committee (LSAC) process. While many of the citizens agreed with the LSAC process in principle, those in the effected townships felt that there were factors which had not been properly considered that resulted in the placement or selection of the size of the potential landfills, that is, a landfill sized to serve the County's needs for forty years, the traffic impacts that would be felt on some of the villages, particularly Lake Orion and Oxford, and also on the Highland community and the possible disruption of the

peace and quiet of the area and various environmental impacts on groundwater, air quality and animal life.

Response: The Oakland County Board of Commissioners passed a resolution on March 22, 1990 indicating that the County should not consider a landfill sized to meet the forty year needs of the County, but rather the County should look for smaller landfills closer to the centers of solid waste generation. The Board resolved that the County should meet its landfill needs over the next seven to ten years through contractual arrangements with private industry. In the meantime the County should resume looking for smaller landfill sites that could eventually be acquired by the County to satisfy the County's future needs.

LANDFILLS

Concerns: Citizens and municipal officials throughout the County are concerned that the County not become an overall net importer of solid waste resulting from a proliferation of landfills. They do not want to become the dumping ground of the region. They are also concerned about the impact the present and future landfills will have on the environment and on their way of life.

Response: The Solid Waste Management Plan states a policy relating to the inter-county flow of waste and in the policy the County would not become a net importer of waste. The Plan also looks at a process for siting future facilities. The Plan requires that future facilities will not be sited unless it can be demonstrated that a need exists in Oakland County for those facilities, and that those facilities would be necessary for the solid waste management of Oakland County. The County will look to the private sector to supply the immediate landfill needs of Oakland County, but only if the landfills are designed and operated in accordance with strict standards established by Oakland County.

WASTE-TO-ENERGY FACILITY

Concern: Some citizens are concerned that the proposed waste-to-energy facility will cause unnecessary air pollution resulting in sickness, cancer and death. There was also concern that the waste-to-energy facility would discourage recycling.

Response: The Solid Waste Planning Committee reviewed material relating to the waste-to-energy facility and determined that the waste-to-energy facility would not pose a health danger to the community. Under the

County Plan, approximately 40% of the solid waste generated in the County will be recycled with the waste-to-energy facilities operating at peak capacity. If the County is able to achieve its recycling, composting, reduction and reuse goals, there will still be enough non-recyclable, non-compostable waste available to supply both the County waste-to-energy facility and the SOCRRA waste-to-energy facility with all the waste necessary for each facility to operate at full capacity. It was the determination of the SWPC that County Plan was properly proportioned to allow for the waste-to-energy facilities as sized without any detriment to the recycling programs.

NEED FOR AN INTEGRATED WASTE DISPOSAL SYSTEM

Concern: Some of the citizens expressed the concern that the County should look for an integrated solid waste disposal system. They also stressed recycling as opposed to landfilling and incineration as a better way of managing the solid waste stream. Those citizens were concerned that the facilities envisioned in the proposed Plan would be detrimental to the environment. They stressed the need to look for high technology to preserve the integrity of the environment.

Response: Oakland County's Solid Waste Management Plan is a very high-tech integrated plan that stresses the reduction of the solid waste stream by up to 50% through reduction, reuse, composting and recycling. The remainder of the waste stream that was burnable would be incinerated with energy recovery. The residue from these processes and the unburnable materials would go to a landfill for final disposal. This system is designed to give the highest possible level of protection to the environment and still handle our solid waste stream.

DISPOSAL OF WASTE TIRES

Concern: Several citizens spoke of their concern with the problems caused by the improper disposal of waste tires or recycling waste tires. The tire piles that are growing in various spots around the country often result in fires and the release of toxic chemicals and gases into the air and the groundwater. Tires disposed of in landfills have a way of working their way to the surface. Methods for recycling used tires are limited and can only accommodate a fraction of the number of used tires being accumulated.

Response: The Solid Waste Planning Committee adopted a resolution to take affirmative action to discourage

the above-ground storage or land disposal of whole tires. They suggested that the tires be shredded, split, pulverized or subjected to other methods of treatment to improve the recycling and marketability of the used tires.

THE HEADLEE ISSUE

Concern: Several citizens suggested that the County should submit the proposed bond issues that would finance the Solid Waste Management Program to the public for a vote. They felt that what County has presently proposed is in violation of the Headlee Amendment to the Michigan constitution.

Response: Terry Donnelly of Dickinson, Wright, Moon, VanDusen & Freeman, legal counsel for the County and the Solid Waste Planning Committee, has issued an opinion that the method of financing which the County has proposed is completely legal and will satisfy the requirements of the Michigan constitution and that a vote of the people is not required.

INTERIM SITING PROCEDURES

Concern: Many people were concerned with the procedures established for siting waste disposal or management facilities between the five year updates of the Solid Waste Management Plan. Some were concerned that the criteria for evaluating proposed facilities were not strict and/or specific enough. Others were concerned with the proposal that following review and recommendation by the Review Committee that the County Executive would make the determination as to whether or not a facility should be included in the Plan.

Response: The Solid Waste Planning Committee has spent a great deal of time in evaluating and determining the criteria to be included in the interim siting procedure. It is the opinion of the SWPC that the more subjective criteria which are included in the Plan are appropriate for the review committee and that the more objective and technical 641 requirements covered by the Act 641 Rules and Regulations are more properly addressed during the application process to the Michigan Department of Natural Resources. The SWPC did amend the interim siting procedures to require Board of Commissioner action upon the receipt of a recommendation from the County Executive to include an application for a proposed site in the County Plan. The SWPC also recommended that the Michigan Aeronautics Commission must be contacted regarding the siting of any landfill.

HAZARDOUS WASTES

Concern: Some citizens were concerned that hazardous waste would be included in the waste disposed of in the landfills. Others were concerned as to how to handle household hazardous wastes.

Response: This Act 641 Solid Waste Management Plan is for the proper disposal of non-hazardous solid waste. It does not address the disposal of hazardous wastes. Those are covered by Act 64. Waste coming into disposal facilities will be inspected by the operators and every attempt will be made to keep hazardous wastes from being disposed of in the facilities. Also, the County will develop a household hazardous waste collection program in the future.

641 PLAN UPDATE

Concern: Most citizens speaking concerning the 641 Plan Update seemed to favor the overall plan in general. They were opposed to the inclusion of one or two particular facilities in the Plan, but overall felt the Plan Update was needed and, with the exception of their particular objection, seemed to be a very good plan.

Response: The largest number of objections received concerned the proposed inclusion of the Holloway Type III landfill to be located in Novi Township. Comments on landfills in general was the second highest area of concern. The Solid Waste Planning Committee considered the comments of the citizens at both the public hearing and during the public comment period. They attempted to address those concerns but realized in many instances the concern expressed was a very colloquial concern with a single issue in the plan. The SWPC endeavored to develop a plan that will be realistic and implementable as well as a plan which will afford a high degree of protection to our environment.

APPENDIX E

ACT 641

SOLID WASTE MANAGEMENT ACT
Act 641 of 1978

AN ACT to protect the public health and the environment; to provide for the regulation and management of solid wastes including ash resulting from the combustion of certain solid wastes; to prescribe the powers and duties of certain state and local agencies and officials; to prescribe penalties; to make an appropriation; and to repeal certain acts and parts of acts.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

The People of the State of Michigan enact:

299.401 Short title.

Sec. 1. This act shall be known and may be cited as the "solid waste management act".

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

Cited in other sections: Section 299.401 et seq. is cited in §§ 45.582, 124.508a, 287.659, 299.373, 299.374, 299.381, 299.389, 299.505, 299.506a, 299.507a, 299.525, 299.609c, and 299.847.

299.402 Meanings of words and phrases.

Sec. 2. The words and phrases defined in sections 3 to 7 shall have the meanings ascribed to them in those sections.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

299.403 Definitions; A to C.

Sec. 3. (1) "Applicant" means an individual, sole proprietorship, partnership, corporation, association, municipality, this state, a county, or any other governmental authority created by statute.

(2) "Ashes" means the residue from the burning of wood, coal, coke, refuse, wastewater sludge, or other combustible materials.

(3) "Bond" means a surety bond from a surety company authorized to transact business in this state, a certificate of deposit, a cash bond, or an irrevocable letter of credit, in favor of the director.

(4) "Certified health department" means a city, county, or district department of health which is specifically delegated authority by the director to perform designated activities as prescribed by this act.

(5) "Collection center" means a tract of land, building, unit, or appurtenance or combination thereof that is used to collect junk motor vehicles and farm implements under section 23.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1981, Act 88, Imd. Eff. July 2, 1981.

299.404 Definitions; D to G.

Sec. 4. (1) "Department" means the department of natural resources.

(2) "Director" means the director of the department of natural resources.

(3) "Disposal area" means a solid waste transfer facility, incinerator, sanitary landfill, processing plant, or other solid waste handling or disposal facility utilized in the disposal of solid waste.

(4) "Enforceable mechanism" means a legal method whereby the state, a county, a municipality, or a person is authorized to take action to guarantee compliance with an approved county solid waste management plan. Enforceable mechanisms include contracts, intergovernmental agreements, laws, ordinances, rules, and regulations.

(5) "Garbage" means rejected food wastes including waste accumulation of animal, fruit, or vegetable matter used or intended for food or that attends the preparation, use, cooking, dealing in, or storing of meat, fish, fowl, fruit, or vegetable.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

299.405 Definitions; H to P.

Sec. 5. (1) "Health officer" means a full-time administrative officer of a certified city, county, or district department of health.

(2) "Inert material" means a substance that will not decompose, dissolve, or in any other way form a contaminated leachate upon contact with water, or other liquids determined by the director as likely to be found at the disposal area, percolating through the substance.

(3) "Landfill" means a disposal area that is a sanitary landfill.

(4) "Municipal solid waste incinerator" means an incinerator that is owned or operated by any person, and meets all of the following requirements:

(a) The incinerator receives solid waste from off site and burns only household waste from single and multiple dwellings, hotels, motels, and other residential sources, or this household waste together with solid waste from commercial, institutional, municipal, county, or industrial sources that, if disposed of, would not be required to be placed in a disposal facility licensed under the hazardous waste management act, Act No. 64 of the Public Acts of 1979, being sections 299.501 to 299.551 of the Michigan Compiled Laws.

(b) The incinerator has established contractual requirements or other notification or inspection procedures sufficient to assure that the incinerator receives and burns only waste referred to in subdivision (a).

(c) The incinerator meets the requirements of this act and the rules promulgated under this act.

(d) The incinerator is not an industrial furnace as defined in 40 C.F.R. 260.10.

(5) "Municipal solid waste incinerator ash" means the substances remaining after combustion in a municipal solid waste incinerator.

(6) "Municipality" means a city, township, or village.

(7) "Perpetual care trust fund" means a perpetual care trust fund provided for in section 19b.

(8) "Person" means an individual; sole proprietorship; partnership; association; corporation, public or private, organized or existing under the laws of this state or any other state, including a federal corporation; this state or an agency or department of this state; a municipality in this state; or a county in this state.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.406 Definitions; R, S.

Sec. 6. (1) "Recyclable materials" means source separated materials, site separated materials, high grade paper, glass, metal, plastic, aluminum, newspaper, corrugated paper, yard clippings, and other materials that may be recycled or composted.

(2) "Regional solid waste management planning agency" means the regional solid waste planning agency designated by the governor pursuant to section 4006 of subtitle D of the solid waste disposal act, title II of Public Law 89-272, 42 U.S.C. 6946.

(3) "Resource recovery facility" means machinery, equipment, structures, or any parts or accessories of machinery, equipment, or structures, installed or acquired for the primary purpose of recovering materials or energy from the waste stream.

(4) "Rubbish" means nonputrescible solid waste, excluding ashes, consisting of both combustible and noncombustible waste, including paper, cardboard, metal containers, yard clippings, wood, glass, bedding, crockery, demolished building materials, or litter of any kind that may be a detriment to the public health and safety.

(5) "Rule" means a rule promulgated pursuant to the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, as amended, being sections 24.201 to 24.328 of the Michigan Compiled Laws.

(6) "Salvaging" means the lawful and controlled removal of reusable materials from solid waste.

(7) "Site separated material" means glass, metal, wood, paper products, plastics, rubber, textiles, garbage, yard clippings, or any other material approved by the director that is separated from solid waste for the purpose of conversion into raw materials or new products. Site separated material does not include the residue remaining after glass, metal, wood, paper products, plastics, rubber, textiles, or any other material approved by the director is separated from solid waste.

(8) "Slag" means the nonmetallic product resulting from melting or smelting operations for iron or steel.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1981, Act 88, Imd. Eff. July 2, 1981;--Am. 1987, Act 209, Eff. Mar. 30,

1988;--Am. 1988, Act 6, Imd. Eff. Feb. 8, 1988;--Am. 1988, Act 428, Imd. Eff. Dec. 27, 1988.

299.407 Definitions; S to Y.

Sec. 7. (1) "Solid waste" means garbage, rubbish, ashes, incinerator ash, incinerator residue, street cleanings, municipal and industrial sludges, solid commercial and solid industrial waste, and animal waste. Solid waste does not include the following:

(a) Human body waste.

(b) Liquid waste.

(c) Ferrous or nonferrous scrap directed to a scrap metal processor or to a reuser of ferrous or nonferrous products.

(d) Slag or slag products directed to a slag processor or to a reuser of slag or slag products.

(e) Sludges and ashes managed as recycled or nondetrimental materials appropriate for agricultural or silvicultural use pursuant to a plan approved by the director.

(f) Materials approved for emergency disposal by the director.

(g) Source separated materials.

(h) Site separated material.

(i) Fly ash or any other ash produced from the combustion of coal, when used in the following instances:

(*i*) With a maximum of 6% of unburned carbon as a component of concrete, grout, mortar, or casting molds.

(*ii*) With a maximum of 12% unburned carbon passing M.D.O.T. test method MTM 101 when used as a raw material in asphalt for road construction.

(*iii*) As aggregate, road, or building material which in ultimate use will be stabilized or bonded by cement, limes, or asphalt.

(*iv*) As a road base or construction fill which is covered with asphalt, concrete, or other material approved by the director and which is placed at least 4 feet above the seasonal groundwater table.

(*v*) As the sole material in a depository designed to reclaim, develop, or otherwise enhance land, subject to the approval of the director. In evaluating the site, the director shall consider the physical and chemical properties of the ash including leachability, and the engineering of the depository, including, but not limited to, the compaction, control of surface water and groundwater that may threaten to infiltrate the site, and evidence that the depository is designed to prevent water percolation through the material.

(j) Other wastes regulated by statute.

(2) "Solid waste hauler" means a person who owns or operates a solid waste transporting unit.

(3) "Solid waste processing plant" means a tract of land, building, unit, or appurtenance of a building or unit or a

combination of land, buildings, and units that is used or intended for use for the processing of solid waste or the separation of material for salvage or disposal, or both, but does not include a plant engaged primarily in the acquisition, processing, and shipment of ferrous or nonferrous metal scrap, or a plant engaged primarily in the acquisition, processing, and shipment of slag or slag products.

(4) "Solid waste transporting unit" means a container which may be an integral part of a truck or other piece of equipment used for the transportation of solid waste.

(5) "Solid waste transfer facility" means a tract of land, a building and any appurtenances, or a container, or any combination of land, buildings, or containers that is used or intended for use in the rehandling or storage of solid waste incidental to the transportation of the solid waste, but is not located at the site of generation or the site of disposal of the solid waste.

(6) "Source separated material" means glass, metal, wood, paper products, plastics, rubber, textiles, garbage, yard clippings, or any other material approved by the director that is separated at the source of generation for the purpose of conversion into raw materials or new products.

(7) "Yard clippings" means fallen leaves, cut grass, or other organic debris that can be converted to humus.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1981, Act 88, Imd. Eff. July 2, 1981;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1988, Act 6, Imd. Eff. Feb. 8, 1988.

299.408 Development of methods for disposal of solid waste; construction and administration of act; exemption of inert material from regulation.

Sec. 8. (1) The department and a health officer shall assist in developing and encouraging methods for the disposal of solid waste which are environmentally sound, which maximize the utilization of valuable resources, and which encourage resource conservation including source reduction and source separation.

(2) This act shall be construed and administered to encourage and facilitate the effort of all persons to engage in source separation and site separation of material from solid waste, and other environmentally sound measures to prevent materials from entering the waste stream or which encourage the removal of materials from the waste stream.

(3) The director may exempt from regulation under this act solid waste which is determined by the director to be inert material for uses and in a manner approved by the director.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1988, Act 428, Imd. Eff. Dec. 27, 1988.

299.409 Solid waste management program; certification.

Sec. 9. A city, county, or district health department may be certified by the director to perform a solid waste management program. Certification procedures shall be established by the director by rule. The director may rescind certification upon request of the certified health department or after reasonable notice and hearing if

the director finds that a certified health department is not performing the program as required.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.410 Construction permit for establishment of disposal area; application; contents; engineering plan; fee; criteria for determining fee; hydrogeological conditions; resubmitting application; additional information.

Sec. 10. (1) Except as otherwise provided in section 22a, a person otherwise allowed under this act to own or operate a solid waste disposal area shall not establish a disposal area without a construction permit from the director, contrary to an approved solid waste management plan, or contrary to a permit, license, or final order issued pursuant to this act. A person proposing the establishment of a disposal area shall make application for a construction permit to the director through the health officer on a form provided by the director. If the disposal area is located in a county or city that does not have a certified health department, the application shall be made directly to the director.

(2) The application for a construction permit shall contain the name and residence of the applicant, the location of the proposed disposal area, and other information considered necessary by the director. The application shall be accompanied by an engineering plan and a construction permit application fee that has been established on a graduated scale from $300.00 to $700.00. The director shall establish by rule the scale for determining the initial construction permit application fees. The criteria for determining the application fee for a construction permit for a disposal area that is a sanitary landfill shall include, at a minimum, site size, projected waste volume, nature of the waste, and hydrogeological characteristics. The criteria for determining the application fee for a construction permit for a disposal area that is either a solid waste transfer facility or a processing plant shall include, at a minimum, the projected waste volume and the nature of the waste. A construction permit application for a disposal area that is a sanitary landfill shall be accompanied by a determination of existing hydrogeological conditions specified in a hydrogeological report and monitoring program consistent with rules promulgated by the director for groundwater quality standards, an environmental assessment, and an engineering plan.

(3) An applicant for a construction permit, within 6 months after a permit denial, may resubmit the application, together with the additional information as needed to address the reasons for denial, without being required to pay an additional application fee.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.411 Advisory analysis of proposed disposal area; duties of director upon receipt of construction permit application.

Sec. 11. (1) Before the submission of a construction permit application for a new disposal area, the applicant shall request a

health officer or the director to provide an advisory analysis of the proposed disposal area. However, the applicant, not less than 15 days after the request, and notwithstanding an analysis result, may file an application for a construction permit.

(2) Upon receipt of a construction permit application, the director or an authorized representative of the director shall:

(a) Immediately notify the clerk of the municipality in which the disposal area is located or proposed to be located, the local soil erosion and sedimentation control agency, each division within the department that has responsibilities in land, air, or water management, and the designated regional solid waste management planning agency.

(b) Publish a notice in a newspaper having major circulation in the vicinity of the proposed disposal area. The required published notice shall contain a map indicating the location of the proposed disposal area and shall contain a description of the proposed disposal area and the location where the complete application package may be reviewed and where copies may be obtained.

(c) Indicate in the public, departmental, and municipality notice that the department shall hold a public hearing in the area of the proposed disposal area if a written request is submitted by the applicant or a municipality within 30 days after the date of publication of the notice, or by a petition submitted to the department containing a number of signatures which is equal to not less than 10% of the number of registered voters of the municipality where the proposed disposal area is to be located who voted in the last gubernatorial election. The petition shall be validated by the clerk of the municipality. The public hearing shall be held after the director makes a preliminary review of the application and all pertinent data and before a construction permit is issued or denied.

(d) Review the plans of the proposed disposal area to determine if it complies with this act and the rules promulgated under this act. The review shall be made by persons qualified in hydrogeology and sanitary landfill engineering. A written approval by the persons qualified in hydrogeology and sanitary landfill engineering shall be received before a construction permit is issued. If the site review, plan review, and the application meet the requirements of this act and the rules promulgated under this act, the director shall issue a construction permit which may contain a stipulation specifically applicable to the site and operation. Except as otherwise provided in section 32a, an expansion of the area of a disposal area, an enlargement in capacity of a disposal area, or an alteration of a disposal area to a different type of disposal area than had been specified in the previous construction permit application shall constitute a new proposal for which a new construction permit is required. The upgrading of a disposal area type required by the director to comply with this act or the rules promulgated under this act or to comply with a consent order shall not require a new construction permit.

(e) Notify the Michigan aeronautics commission if the disposal area is a sanitary landfill proposed to be located within 10,000 feet of a runway or a proposed runway extension contained in a plan approved by the Michigan aeronautics commission of an airport licensed and regulated by the Michigan aeronautics commission. The director shall make a copy of the application available to the Michigan aeronautics commission. If, after a period of time for review and comment not to exceed 60 days, the Michigan aeronautics commission informs the director that it finds that operation of the

proposed disposal area would present a potential hazard to air navigation and presents the basis for its findings, the director may either recommend appropriate changes in the location, construction, or operation of the proposed disposal area or deny the application for a construction permit. The director shall give an applicant an opportunity to rebut a finding of the Michigan aeronautics commission that the operation of a proposed disposal area would present a potential hazard to air navigation.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.412 Final decision on issuance of construction permit; expiration of construction permit; renewal of permit; fee; additional information; criteria for determining fee; conditions to issuance of construction permit for disposal area.

Sec. 12. (1) The director shall make a final decision as to whether to issue a construction permit within 120 days after the director receives an administratively complete application. The decision of the director and the reasons for the decision shall be in writing and shall be sent by first class mail to the clerk of the municipality in which the disposal area is proposed to be located and to the applicant within 10 days after the final decision is made. If the director fails to make a final decision within 120 days, the permit shall be considered issued.

(2) A construction permit shall expire 1 year after the date of issuance, unless development under the construction permit is initiated within that year. A construction permit that has expired may be renewed upon payment of a permit renewal fee and submission of any additional information the director may require. The permit renewal application fee shall be established on a graduated scale from $100.00 to $500.00. The director shall establish the criteria by rule for determining the construction permit renewal application fee. The criteria for determining a renewal application fee for a construction permit for a disposal area that is a sanitary landfill shall include, at a minimum, site size, projected waste volume, nature of the waste, and hydrogeological characteristics. The criteria for determining a renewal application fee for a construction permit for a disposal area that is a solid waste transfer facility or processing plant shall include, at a minimum, the projected waste volume and the nature of the waste.

(3) Beginning on the effective date of the amendatory act which adds this subsection and except as otherwise provided in this subsection, the director shall not issue a construction permit for a disposal area within a planning area unless a solid waste management plan for that planning area has been approved pursuant to sections 28 and 29 and unless the disposal area complies with and is consistent with the approved solid waste management plan. The director may issue a construction permit for a disposal area designed to receive ashes produced in connection with the combustion of fossil fuels for electrical power generation in the absence of an approved county solid waste management plan, upon receipt of a letter of approval from whichever county or counties, group of municipalities, or regional planning agency has prepared or is preparing the county solid waste management plan for that planning area under section 25 and from the municipality in which the disposal area is to be located.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.413 Disposal of solid waste at licensed disposal area; license required to conduct, manage, maintain, or operate disposal area; application; form; contents; fee; certification; resubmitting application; additional information or corrections; operation of incinerator without operating license.

Sec. 13. (1) A person shall dispose of solid waste at a disposal area licensed under this act unless a person is permitted by state law or rules promulgated by the department to dispose of the solid waste at the site of generation.

(2) Except as otherwise provided in this section or in section 22a, a person otherwise allowed under this act to own or operate a solid waste disposal area shall not conduct, manage, maintain, or operate a disposal area within this state without a license from the director, contrary to an approved solid waste management plan, or contrary to a permit, license, or final order issued under this act. A person who intends to conduct, manage, maintain, or operate a disposal area shall make a prior license application to the director through a certified health department on a form provided by the director. If the disposal area is located in a county or city that does not have a certified health department, the application shall be made directly to the director.

(3) The application for a license shall contain the name and residence of the applicant, the location of the proposed or existing disposal area, and other information the director considers necessary. The application shall be accompanied by a fee of $100.00.

(4) At the time of application for a license for a disposal area, the applicant shall submit to a health officer or the director a certification under the seal of a licensed professional engineer verifying that the construction of the disposal area has proceeded according to the approved plans. The director shall require additional certification during intermediate progression of the operation, or to verify proper closure of the site.

(5) An applicant for an operating license, within 3 months after a license denial, may resubmit the application, together with additional information or corrections as are necessary to address the reason for denial, without being required to pay an additional application fee.

(6) In order to conduct tests and assess operational capabilities, the owner or operator of a municipal solid waste incinerator that is designed to burn at a temperature in excess of 2500 degrees Fahrenheit may operate the incinerator without an operating license, upon notice to the director, for a period not to exceed 60 days.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.413a Acceptance of solid waste or municipal solid waste incinerator ash for disposal; enforcement.

Sec. 13a. A person shall not accept for disposal solid waste or municipal solid waste incinerator ash that is not generated in the county in which the disposal area is located unless the acceptance of solid waste or municipal solid waste incinerator ash that is not generated in the county is explicitly authorized in the approved county solid waste management plan. The department shall take action to enforce this section within 30 days of obtaining knowledge of a violation of this section.

History: Add. 1988, Act 475, Imd. Eff. Dec. 28, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

299.414 Inspection of site; compliance; hydrogeologic monitoring program as condition to licensing landfill facility; determining course of action; revocation of license; issuance of timetable or schedule.

Sec. 14. (1) Upon receipt of a license application, the director or health officer or an authorized representative of the director or health officer shall inspect the site and determine if the proposed operation complies with this act and the rules promulgated under this act.

(2) The department shall not license a landfill facility operating without an approved hydrogeologic monitoring program until the department receives a hydrogeologic monitoring program and the results of the program. The director shall use this information in conjunction with other information required by this act or the rules promulgated pursuant to this act to determine a course of action regarding licensing of the facility consistent with section 4005 of title 2 of the solid waste disposal act, 42 U.S.C. 6945, and with this act and the rules promulgated pursuant to this act. In deciding a course of action, the director shall consider, at a minimum, the health hazards, environmental degradation, and other public or private alternatives. The director may revoke a license or issue a timetable or schedule to provide for compliance for the facility or operation which specifies a schedule of remedial measures, including a sequence of actions or operations, which leads to compliance with this act within a reasonable time period but not later than 2 years after the effective date of this amendatory act.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1985, Act 167, Imd. Eff. Dec. 2, 1985;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Compiler's note: In subsection (2), "title 2" evidently should read "title II".

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.415 Final decision on license application; time; effect of failure to make final decision; exception; expiration and renewal of operating license; fee; entry on private or public property; inspection or investigation; conditions to issuance of operating license for new disposal area.

Sec. 15. (1) Subject to subsection (4), the director shall make a final decision on a license application within 90 days after the director receives the application. The decision of the director and the reasons for the decision shall be in writing and shall be sent by first class mail to the clerk of the municipality in which the disposal area is located and to the applicant within 10 days after the

final decision is made. If the director fails to make a final decision within 90 days, the license shall be considered issued.

(2) An operating license shall expire 2 years after the date of issuance. An operating license may be renewed before expiration upon payment of a renewal application fee of $100.00 if the licensee is in compliance with this act and the rules promulgated under this act.

(3) The issuance of a license shall empower the director or a health officer or an authorized representative of the director or health officer to enter at any reasonable time, pursuant to law, in or upon private or public property licensed under this act for the purpose of inspecting or investigating conditions relating to the storage, processing, or disposal of any material.

(4) Beginning on the effective date of the amendatory act which adds this subsection and except as otherwise provided in this subsection, the director shall not issue an operating license for a new disposal area within a planning area unless a solid waste management plan for that planning area has been approved pursuant to sections 28 and 29 and unless the disposal area complies with and is consistent with the approved solid waste management plan. The director may issue an operating license for a disposal area designed to receive ashes produced in connection with the combustion of fossil fuels for electrical power generation in the absence of an approved county solid waste management plan, upon receipt of a letter of approval from whichever county or counties, group of municipalities, or regional planning agency has prepared or is preparing the county solid waste management plan for that planning area under section 25 and from the municipality in which the disposal area is to be located.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.415a Plan for program reducing incineration of noncombustible materials and dangerous combustible materials and other hazardous by-products; approval or disapproval; considerations; modifications; revised plan; implementation; operation without approved plan.

Sec. 15a. (1) Within 9 months after the effective date of this section, or within 9 months after the completion of construction of a municipal solid waste incinerator, whichever is later, the owner or operator of a municipal solid waste incinerator shall submit a plan to the director for a program that, to the extent practicable, reduces the incineration of noncombustible materials and dangerous combustible materials and their hazardous by-products at the incinerator. The director shall approve or disapprove the plan submitted under this subsection within 30 days of receiving it. In reviewing the plan, the director shall consider the current county solid waste management plan, available markets for separated materials, disposal alternatives for the separated materials, and collection practices for handling such separated materials. If the director disapproves a plan, he or she shall notify the owner or operator submitting the plan of this fact, and shall provide modifications that, if included, would result in the plan's approval. If the director disapproves a plan, the owner or operator of a municipal solid waste incinerator shall within 30 days after receipt of the director's disapproval submit a revised plan that addresses all of the modifications provided by the director. The director shall approve or

disapprove the revised plan within 30 days of receiving it, and approval of the revised plan shall not be unreasonably withheld.

(2) Not later than 6 months after the approval of the plan by the director under subsection (1), the owner or operator shall implement the plan in accordance with the implementation schedule set forth in the plan. The operation of a municipal solid waste incinerator without an approved plan under this section shall subject the owner or operator, or both, to all of the sanctions provided by this act.

History: Add. 1989, Act 52, Imd. Eff. June 12, 1989.

299.416 Sanitary landfill; instrument imposing restrictive covenant on land; filing; contents of covenant; authorization; special exemption; construction of act.

Sec. 16. (1) At the time of licensing of a disposal area which is a sanitary landfill, an instrument which imposes a restrictive covenant upon the land involved shall be executed by all of the owners of the tract of land upon which the landfill is to be located and the director. If the land involved is state owned, the state administrative board shall execute the covenant on behalf of the state. The instrument imposing the restrictive covenant shall be filed for record by the director or a health officer in the office of the register of deeds of the county, or counties, in which the facility is located. The covenant shall state that the land described in the covenant has been or will be used as a landfill and that neither the property owners, their servants, agents, or employees, nor any of their heirs, successors, lessees, or assigns shall engage in filling, grading, excavating, drilling, or mining on the property during the first 50 years following completion of the landfill without authorization of the director. In giving authorization, the director shall consider the original design, type of operation, material deposited, and the stage of decomposition of the fill. Special exemption from this section may be granted by the director if the lands involved are federal lands or if contracts existing between the landowner and the licensee on January 11, 1979 are not renegotiable.

(2) This act shall not be construed to prohibit the natural resources commission from conveying, leasing, or permitting the use of state land for a solid waste disposal area or a resource recovery facility as provided by applicable state law.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

299.417 Specifying reasons for denial of construction permit or operating license; cease and desist order; grounds for order revoking, suspending, or restricting permit or license; contested case hearing; judicial review; inspection; report; copies; violation of act or rules; summary suspension of permit or license.

Sec. 17. (1) The director shall specify, in writing, the reasons for denial of a construction permit or an operating license, specifying those particular sections of this act or rules promulgated under this act which may be violated by granting the application, and in what manner the violation may occur.

(2) The health officer or director may issue a cease and desist order specifying a schedule of closure or remedial action in accordance with this act and rules promulgated pursuant to this act or may establish a consent agreement specifying a schedule of closure or remedial action in accordance with this act and rules promulgated

pursuant to this act to a person who establishes, constructs, conducts, manages, maintains, or operates a disposal area without a permit or license, or to a person who holds a permit or license but establishes, constructs, conducts, manages, maintains, or operates a disposal area contrary to an approved solid waste management plan or contrary to the permit or license issued under this act.

(3) The director may issue a final order revoking, suspending, or restricting a permit or license after a contested case hearing as provided in the administrative procedures act of 1969, Act No. 306 of the Public Acts of 1969, being sections 24.201 to 24.328 of the Michigan Compiled Laws, if the director finds that the disposal area is not being constructed or operated in accordance with the approved plans, the conditions of a permit or license, this act, or the rules promulgated under this act. A final order issued pursuant to this section is subject to judicial review as provided in Act No. 306 of the Public Acts of 1969. The director or a health officer shall inspect and file a written report not less than 4 times per year for each licensed disposal area. The director or the health officer shall provide the municipality in which the licensed disposal area is located with a copy of each written inspection report if the municipality arranges with the director or the health officer to bear the expense of duplicating and mailing the reports.

(4) The director, after consultation with the director of public health or a designated representative of the director of public health, may issue an order summarily suspending a permit or license if the director determines that a violation of this act or rules promulgated under this act has occurred which, in the director's opinion, constitutes an emergency or poses an imminent risk of injury to the public health or the environment. A determination that a violation poses an imminent risk of injury to the public health shall be made by the director of public health. Summary suspension may be ordered effective on the date specified in the order or upon service of a certified copy of the order on the licensee, whichever is later, and shall remain effective during the proceedings. The proceedings shall be commenced within 7 days of the issuance of the order and shall be promptly determined.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.418 Disposition of fees; special fund; disposition of solid waste on private property.

Sec. 18. (1) Fees collected by a health officer under this act shall be deposited with the city or county treasurer, who shall keep the deposits in a special fund designated for use in carrying out the purposes of this act. If there is an ordinance or charter provision that prohibits a health officer from maintaining a special fund, the fees shall be deposited and used in accordance with the ordinance or charter provision. Fees collected by the director under this act shall be credited to the general fund of the state.

(2) This act shall not be construed to prohibit an individual from disposing of solid waste from the individual's own household upon the individual's own land as long as the disposal does not create a nuisance or hazard to health. Solid waste accumulated as a part of an improvement or the planting of privately owned farmland may be disposed of on the property if the method used is not injurious to

human life or property and does not unreasonably interfere with the enjoyment of life or property.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

299.419 Bond required; amount; assurance; cash bond instead of surety bond or certificate of deposit; payments; interest; reduction in bond; noncompliance; additional bond or letter of credit for landfill receiving municipal solid waste incinerator ash; effect of bankruptcy action.

Sec. 19. (1) The director shall not issue a license to operate a disposal area unless the applicant has filed, as a part of the application for a license, a bond to cover the cost of closure and of postclosure monitoring and maintenance of the disposal area after capacity has been reached or operations have otherwise terminated, in accordance with the following:

(a) Except as provided in subdivision (b), a bond established for a landfill shall be in an amount equal to $20,000.00 per acre of licensed landfill. However, the amount of the bond shall be not less than $20,000.00, nor more than $1,000,000.00. Each bond shall provide assurance for the maintenance of the finished landfill site for a period of 30 years after the landfill or any approved portion is completed.

(b) A bond established for a landfill or portion of a landfill that receives municipal solid waste incinerator ash under section 32a shall be in an amount equal to $50,000.00 per acre of licensed landfill or portion of the landfill. Each bond shall provide assurance for the maintenance of the finished landfill site or portion of landfill site for a period of 30 years after the landfill or any approved portion is completed.

(c) A bond established for a solid waste transfer facility, incinerator, processing plant, or other solid waste handling or disposal facility utilized in the disposal of solid waste shall be in an amount equal to 1/4 of 1% of the construction cost of the facility, but shall not be less than $4,000.00, and shall be continued in effect for a period of 2 years after the disposal area is closed.

(d) An applicant for a landfill may post a cash bond with the department as provided for in subsection (2) instead of a surety bond or certificate of deposit. A minimum of $20,000.00 shall be paid to the director prior to licensure. Subsequent payments to the director shall be made every 6 months in an amount per acre of licensed landfill or any approved portion of landfill as determined by the director, until the required amount per acre is attained.

(2) An applicant who elects to use a certificate of deposit as bond shall receive any accrued interest on that certificate of deposit upon release of the bond by the director. An applicant who elects to post cash as bond shall accrue interest on that bond at the annual rate of 6%, to be accrued quarterly, except that the interest rate payable to an applicant shall not exceed the rate of interest accrued on the state common cash fund for the quarter in which an accrual is determined. Interest shall be paid to the applicant upon release of the bond by the director. Any interest greater than 6% shall be deposited in the state treasury to the credit of the general fund and shall be appropriated to the department to be used by the director for administration of this act.

(3) An applicant of a disposal area that is not a landfill who has accomplished closure or postclosure monitoring and maintenance, approved by the director and in accordance with this act and the rules promulgated under this act, may request a 50% reduction in the bond.

(4) The director may utilize a bond required under this section for the closure and postclosure monitoring and maintenance of a disposal area if the applicant fails to comply with the closure and postclosure monitoring and maintenance requirements of this act and the rules promulgated under this act.

(5) In addition to the bond required in subsection (1), a landfill that receives municipal solid waste incinerator ash under section 32a shall provide a bond or a letter of credit in an amount equal to $2,000,000.00. The bond or letter of credit described in this subsection shall provide assurance for remedial action at the landfill for a period of time extending 30 years after the landfill or any portion of the landfill is closed.

(6) The director shall not issue a construction permit or a new license to operate a disposal area to an applicant who or which is the subject of a bankruptcy action commenced under title 11 of the United States Code, 11 U.S.C. 101 to 1330, or any other predecessor statute.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1981, Act 88, Imd. Eff. July 2, 1981;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.420 Repealed. 1979, Act 10, Eff. Mar. 1, 1980.

Compiler's note: Section 2 of Act 10 of 1979 provides: "Effective March 1 of the year following the first appropriation by the legislature to provide financial assistance to a certified health department pursuant to section 34(2), sections 20 and 21 of Act No. 641 of the Public Acts of 1978, being sections 299.420 and 299.421 of the Compiled Laws of 1970, are repealed."

299.420a Inspection of solid waste transporting unit; determination.

Sec. 20a. The director, a health officer, or a law enforcement officer of competent jurisdiction may inspect a solid waste transporting unit that is being used to transport solid waste along a public road to determine if the solid waste transporting unit is designed, maintained, and operated in a manner to prevent littering or to determine if the owner or operator of the solid waste transporting unit is performing in compliance with this act and the rules promulgated pursuant to this act.

History: Add. 1979, Act 10, Eff. Mar. 1, 1980.

299.421 Repealed. 1979, Act 10, Eff. Mar. 1, 1980.

Compiler's note: Section 2 of Act 10 of 1979 provides: "Effective March 1 of the year following the first appropriation by the legislature to provide financial assistance to a certified health

department pursuant to section 34(2), sections 20 and 21 of Act No. 641 of the Public Acts of 1978, being sections 299.420 and 299.421 of the Compiled Laws of 1970, are repealed."

299.421a Delivery of waste to licensed disposal area or solid waste transfer facility; vehicle or container; violation; penalty.

Sec. 21a. A solid waste hauler transporting solid waste over a public road in this state shall deliver all waste to a disposal area or solid waste transfer facility licensed under this act and shall use only a vehicle or container that does not contribute to littering and that conforms to the rules promulgated by the director.

A solid waste hauler who violates this act or a rule promulgated pursuant to this act, or is responsible for a vehicle that has in part contributed to a violation of this act or a rule promulgated pursuant to this act is subject to a penalty as provided in section 36.

History: Add. 1979, Act 10, Eff. Mar. 1, 1980.

299.422 Solid waste transporting unit; watertight; construction, maintenance, and operation; violation; penalties; ordering unit out of service.

Sec. 22. (1) A solid waste transporting unit used for garbage, industrial or domestic sludges, or other moisture laden materials not specifically covered by Act No. 136 of the Public Acts of 1969, being sections 323.271 to 323.280 of the Michigan Compiled Laws, shall be watertight and constructed, maintained, and operated to prevent littering. Solid waste transporting units used for hauling other solid waste shall be designed and operated to prevent littering or any other nuisance.

(2) A solid waste hauler who violates this act or the rules promulgated under this act shall be subject to the penalties provided in this act.

(3) The director, a health officer, or a law enforcement officer may order a solid waste transporting unit out of service if the unit does not satisfy the requirements of this act or the rules promulgated under this act. Continued use of a solid waste transporting unit ordered out of service is a violation of this act.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1979, Act 10, Imd. Eff. May 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.422a Exemptions.

Sec. 22a. (1) A disposal area that is a solid waste transfer facility is not subject to the construction permit and operating license requirements of this act if either of the following circumstances exists:

(a) The solid waste transfer facility is not designed to accept wastes from vehicles with mechanical compaction devices.

(b) The solid waste transfer facility accepts less than 200 uncompacted cubic yards per day.

(2) The solid waste transfer facilities exempted from the construction permit and operating license requirements of this act by subsection (1) shall comply with the operating requirements of this act and the rules promulgated under this act.

(3) Except as provided in subsection (5), a disposal area that is an incinerator may, but is not required to, comply with the construction permit and operating license requirements of this act if both of the following conditions are met:

(a) The operation of the incinerator does not result in the exposure of any solid waste to the atmosphere and the elements.

(b) The incinerator has a permit issued under the air pollution act, Act No. 348 of the Public Acts of 1965, being sections 336.11 to 336.36 of the Michigan Compiled Laws.

(4) A disposal area that is an incinerator that does not comply with the construction permit and operating license requirements of this act as permitted in subsection (3) remains subject to the planning provisions of this act and must be included in the county solid waste management plan for the county in which the incinerator is located.

(5) A disposal area that is a municipal solid waste incinerator that is designed to burn at a temperature in excess of 2500 degrees Fahrenheit is not subject to the construction permit requirements of this act.

History: Add. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.423 Collection center for junk motor vehicles and farm implements; competitive bidding; bonds; "collect" defined.

Sec. 23. (1) A municipality or county may establish and operate a collection center for junk motor vehicles and farm implements.

(2) A municipality or county may collect junk motor vehicles and farm implements and dispose of them through its collection center, through the process of competitive bidding.

(3) A municipality or county may issue bonds as necessary pursuant to Act No. 342 of the Public Acts of 1969, as amended, being sections 141.151 to 141.153 of the Michigan Compiled Laws, to finance the cost of constructing or operating facilities to collect junk motor vehicles or farm implements. The bonds shall be general obligation bonds and shall be backed by the full faith and credit of the municipality or county.

(4) As used in this section, "collect" means to obtain a vehicle pursuant to section 252 of Act No. 300 of the public Acts of 1949, as amended, being section 257.252 of the Michigan Compiled Laws, or to obtain the vehicle or farm implement and its title pursuant to a transfer from the owner.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

299.424 Solid waste removal; frequency; disposal; ordinance.

Sec. 24. (1) A municipality or county shall assure that all solid waste is removed from the site of generation frequently enough to protect the public health, and is delivered to licensed disposal areas, except waste which is permitted by state law or rules promulgated by the department, to be disposed of at the site of generation.

(2) An ordinance enacted by a county or municipality incidental to the financing of a publicly owned disposal area or areas under construction prior to the effective date of the amendatory act that adds this subsection which ordinance directs that all or part of the solid waste generated in that county or municipality shall be directed to such disposal area or areas is hereby ratified and validated as an acceptable means of compliance with subsection (1), notwithstanding that the ordinance, in the case of a county, has not been approved by the governor. This subsection shall apply only to ordinances adopted by the governing body of a county or municipality prior to the effective date of the amendatory act that added this subsection, and is not intended to validate or invalidate an ordinance adopted thereafter as an acceptable means of compliance with subsection (1).

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1988, Act 6, Imd. Eff. Feb. 8, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.425 Initial solid waste management plan; contents; submission to director; review and update; amendment; scope of plan; minimum compliance; consultation with regional planning agency; filing, form, and contents of notice of intent; effect of failure to file notice of intent; vote; preparation of plan by regional solid waste management planning agency or by director; progress report.

Sec. 25. (1) Each solid waste management plan shall include an enforceable program and process to assure that the nonhazardous solid waste generated or to be generated in the planning area for a 20-year period is collected and recovered, processed, or disposed of at disposal areas which comply with state law and rules promulgated by the department governing location, design, and operation of the disposal areas.

(2) An initial solid waste management plan shall be prepared and approved under this section and shall be submitted to the director not later than January 5, 1984. The initial plan shall be prepared for a 20-year period and shall be reviewed and updated every 5 years. An updated plan and an amendment to a plan shall be prepared and approved as provided in sections 25, 26, 27, 28, and 29. The solid waste management plan shall encompass all municipalities within the county. The plan shall at a minimum comply with the requirements of section 30. The solid waste management plan shall take into consideration solid waste management plans in contiguous counties and existing local approved solid waste management plans as they relate to the county's needs. At a minimum, a county preparing a solid waste management plan shall consult with the regional planning agency from the beginning to the completion of the plan.

(3) Not later than July 1, 1981, each county shall file with the director and with each municipality within the county on a form provided by the director, a notice of intent, indicating the county's intent to prepare a county solid waste management plan or to upgrade an existing plan. The notice shall identify the designated agency which shall be responsible for preparing the county plan.

(4) If the county fails to file a notice of intent with the director within the prescribed time, the director immediately shall notify each municipality within the county and shall request those municipalities to prepare the county solid waste management plan and shall convene a meeting to discuss the plan preparation. Within 4 months following notification by the director, the municipalities shall decide by a majority vote of the municipalities in the county whether or not to file a notice of intent to prepare the county solid waste management plan. Each municipality in the county shall have 1 vote. If a majority does not agree, then a notice of intent shall not be filed. The notice shall identify the designated agency which shall be responsible for preparing the county plan.

(5) If the municipalities fail to file a notice of intent to prepare a county solid waste management plan with the director within the prescribed time, the director shall request the appropriate regional solid waste management planning agency to prepare the county solid waste management plan. The regional solid waste management planning agency shall respond within 90 days after the date of the request.

(6) If the regional solid waste management planning agency declines to prepare a county plan, the director shall prepare the plan for the county and that plan shall be final.

(7) A solid waste management planning agency, upon request of the director, shall submit a progress report in preparing its solid waste management plan.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1979, Act 10, Imd. Eff. May 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.426 Planning committee; purpose; appointment, qualifications, and terms of members; approval of appointment; reappointment; vacancy; removal; chairperson; procedures.

Sec. 26. (1) The county executive of a charter county that elects a county executive and that chooses to prepare a solid waste management plan under section 25 or the county board of commissioners in all other counties choosing to prepare an initial 20-year solid waste management plan under section 25, or the municipalities preparing an initial 20-year plan under section 25(4), shall appoint a planning committee to assist the agency designated to prepare the plan under section 25. If the county charter provides procedures for approval by the county board of commissioners of appointments by the county executive, an appointment under this subsection shall be subject to that approval. A planning committee appointed pursuant to this subsection shall be appointed for terms of 2 years. A planning committee appointed pursuant to this subsection may be reappointed for the purpose of completing the preparation of the initial plan or overseeing the implementation of the initial plan. Reappointed members of a planning committee shall serve for terms not to exceed 2 years as determined by the appointing authority. An initial 20-year solid waste management plan shall only be approved by a majority of the members appointed and serving.

(2) A planning committee appointed pursuant to this section shall consist of 14 members. Of the members appointed, 4 shall represent the solid waste management industry, 2 shall represent environmental interest groups, 1 shall represent county government, 1 shall

represent city government, 1 shall represent township government, 1 shall represent the regional solid waste planning agency, 1 shall represent industrial waste generators, and 3 shall represent the general public. A member appointed to represent a county, city, or township government shall be an elected official of that government or the designee of that elected official. Vacancies shall be filled in the same manner as the original appointments. A member may be removed for nonperformance of duty.

(3) A planning committee appointed pursuant to this section shall annually elect a chairperson and shall establish procedures for conducting the committee's activities and for reviewing the matters to be considered by the committee.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

299.427 County or regional solid waste management planning agency; duties.

Sec. 27. A county or regional solid waste management planning agency preparing a solid waste management plan shall:

(a) Solicit the advice and consult periodically during the preparation of the plan with the municipalities, appropriate organizations, and the private sector in the county under section 30(1) and solicit the advice and consult with the appropriate county or regional solid waste management planning agency, and adjacent counties and municipalities in adjacent counties which may be significantly affected by the solid waste management plan for a county.

(b) If a planning committee has been appointed under section 26, prepare the plan with the advice, consultation, and assistance of the planning committee.

(c) Notify, by letter, the chief elected official of each municipality and any other person so requesting within the county, not less than 10 days before each public meeting of the planning agency designated by the county, if that planning agency plans to discuss the county plan. The letter shall indicate as precisely as possible the subject matter being discussed.

(d) Submit for review a copy of the proposed county or regional solid waste management plan to the director, to each municipality within the affected county, and to adjacent counties and municipalities that may be affected by the plan or which have requested the opportunity to review the plan. The county plan shall be submitted for review to the designated regional solid waste management planning agency for that county. Reviewing agencies shall be allowed an opportunity of not less than 3 months to review and comment on the plan before adoption of the plan by the county or a designated regional solid waste management planning agency. The comments of a reviewing agency shall be submitted with the plan to the county board of commissioners or to the regional solid waste management planning agency.

(e) Publish a notice, at the time the plan is submitted for review under subdivision (d), of the availability of the plan for inspection or copying, at cost, by an interested person.

(f) Conduct a public hearing on the proposed county solid waste management plan before formal adoption. A notice shall be published not less than 30 days before a hearing, in a paper having a major circulation within the county. The notice shall indicate a location

where copies of the plan are available for public inspection and the time and place of the public hearing.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

299.428 Request by municipality to be included in plan of adjacent county; approval by resolution; appeal; decision final; formal action on plan; return of plan with statement of objections; review and recommendations; approval by governing bodies; preparation of final plan by director.

Sec. 28. (1) A municipality located in 2 counties or adjacent to a municipality located in another county may request to be included in the adjacent county's plan. The request shall be approved by a resolution of each county board of commissioners of the counties involved before the municipality may be included. A municipality may appeal a decision not to be included in an adjacent county's plan to the director. If there is an appeal, the director shall issue a decision within 45 days. The decision of the director shall be final.

(2) Except as provided in subsection (3), the county board of commissioners shall formally act on the plan following the public hearing required by section 27(f).

(3) If a planning committee has been appointed by the county board of commissioners under section 26(1), the county board of commissioners, or if a plan is prepared under section 25(4), the municipalities in the county who voted in favor of filing a notice of intent to prepare a county solid waste management plan, shall take formal action on the plan after the completion of public hearings and only after the plan has been approved by a majority of the planning committee as provided in section 26(1). If the county board of commissioners, or if a plan is prepared under section 25(4), a majority of the municipalities in the county who voted in favor of filing a notice of intent to prepare a county solid waste management plan, does not approve the plan as submitted, the plan shall be returned to the planning committee along with a statement of objections, to the plan. Within 30 days after receipt, the planning committee shall review the objections and shall return the plan with its recommendations.

(4) Following approval the county plan shall be approved by the governing bodies of not less than 67% of the municipalities within each respective county before the plan may take effect.

(5) A county plan prepared by a regional solid waste management planning agency shall be approved by the governing bodies of not less than 67% of the municipalities within each respective county before the plan may take effect.

(6) If, after the plan has been adopted, the governing bodies of not less than 67% of the municipalities have not approved the plan, the director shall prepare a plan for the county, including those municipalities that did not approve the county plan. A plan prepared by the director shall be final.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

299.429 Approval or disapproval of plan by director; time; minimum requirements; periodic review; revisions or corrections; withdrawal of approval; timetable or schedule for compliance.

Sec. 29. (1) The director shall, within 6 months after a plan has been submitted for approval, approve or disapprove the plan. An approved plan shall at a minimum meet the requirements set forth in section 30(1).

(2) The director shall review an approved plan periodically and determine if revisions or corrections are necessary to bring the plan into compliance with this act. The director may, after notice and opportunity for a public hearing, held pursuant to Public Act No. 306 of the Public Acts of 1969, as amended, withdraw approval of the plan. If the director withdraws approval of a county plan, the director shall establish a timetable or schedule for compliance with this act.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

299.430 Rules for development, form, and submission of initial solid waste management plans; requirements; disposal area serving disposal needs of another county, state, or country; compliance as condition to disposing of, storing, or transporting solid waste; provisions or practices in conflict with act.

Sec. 30. (1) Not later than September 11, 1979, the director shall promulgate rules for the development, form, and submission of initial solid waste management plans. The rules shall require all of the following:

(a) The establishment of goals and objectives for prevention of adverse effects on the public health and on the environment resulting from improper solid waste collection, processing, or disposal including protection of surface and groundwater quality, air quality, and the land.

(b) An evaluation of waste problems by type and volume, including residential and commercial solid waste, hazardous waste, industrial sludges, pretreatment residues, municipal sewage sludge, air pollution control residue, and other wastes from industrial or municipal sources.

(c) An evaluation and selection of technically and economically feasible solid waste management options, which may include sanitary landfill, resource recovery systems, resource conservation, or a combination of options.

(d) An inventory and description of all existing facilities where solid waste is being treated, processed, or disposed of, including a summary of the deficiencies, if any, of the facilities in meeting current solid waste management needs.

(e) The encouragement and documentation as part of the plan, of all opportunities for participation and involvement of the public, all affected agencies and parties, and the private sector.

(f) That the plan contain enforceable mechanisms for implementing the plan, including identification of the municipalities within the county responsible for the enforcement. This subdivision does not preclude the private sector's participation in providing solid waste management services consistent with the county plan.

(g) Current and projected population densities of each county and identification of population centers and centers of solid waste generation, including industrial wastes.

(h) That the plan area has, and will have during the plan period, access to a sufficient amount of available and suitable land, accessible to transportation media, to accommodate the development and operation of solid waste disposal areas, or resource recovery facilities provided for in the plan.

(i) That the solid waste disposal areas or resource recovery facilities provided for in the plan are capable of being developed and operated in compliance with state law and rules of the department pertaining to protection of the public health and the environment, considering the available land in the plan area, and the technical feasibility of, and economic costs associated with, the facilities.

(j) A timetable or schedule for implementing the county solid waste management plan.

(2) In order for a disposal area to serve the disposal needs of another county, state, or country, the service, including the disposal of municipal solid waste incinerator ash, must be explicitly authorized in the approved solid waste management plan of the receiving county. With regard to intercounty service within Michigan, the service must also be explicitly authorized in the exporting county's solid waste management plan.

(3) A person shall not dispose of, store, or transport solid waste in this state unless the person complies with the requirements of this act.

(4) Following approval by the director of a county solid waste management plan and after July 1, 1981, an ordinance, law, rule, regulation, policy, or practice of a municipality, county, or governmental authority created by statute, which prohibits or regulates the location or development of a solid waste disposal area, and which is not part of or not consistent with the approved solid waste management plan for the county, shall be considered in conflict with this act and shall not be enforceable.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1979, Act 10, Imd. Eff. May 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988;--Am. 1988, Act 475, Imd. Eff. Dec. 28, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.430a Plan update; conditions to approval; rules.

Sec. 30a. (1) The director shall not approve a plan update unless:

(a) The plan contains an analysis or evaluation of the best available information applicable to the plan area in regard to recyclable materials and all of the following:

(*i*) The kind and volume of material in the plan area's waste stream that may be recycled or composted.

(*ii*) How various factors do or may affect a recycling and composting program in the plan area. Factors shall include an evaluation of the existing solid waste collection system; materials market; transportation networks; local composting and recycling support groups, or both; institutional arrangements; the population in the plan area; and other pertinent factors.

(*iii*) An identification of impediments to implementing a recycling and composting program and recommended strategies for removing or minimizing impediments.

(*iv*) How recycling and composting and other processing or disposal methods could complement each other and an examination of the feasibility of excluding site separated material and source separated material from other processing or disposal methods.

(*v*) Identification and quantification of environmental, economic, and other benefits that could result from the implementation of a recycling and composting program.

(*vi*) The feasibility of source separation of materials that contain potentially hazardous components at disposal areas. This subparagraph applies only to plan updates that are due after January 31, 1989.

(b) The plan either provides for recycling and composting recyclable materials from the plan area's waste stream or establishes that recycling and composting is not necessary or feasible or is only necessary or feasible to a limited extent.

(c) A plan that proposes a recycling or composting program, or both, details the major features of that program, including all of the following:

(*i*) The kinds and volumes of recyclable materials that will be recycled or composted.

(*ii*) Collection methods.

(*iii*) Measures that will ensure collection such as ordinances or cooperative arrangements, or both.

(*iv*) Ordinances or regulations affecting the program.

(*v*) The role of counties and municipalities in implementing the plan.

(*vi*) The involvement of existing recycling interests, solid waste haulers, and the community.

(*vii*) Anticipated costs.

(*viii*) On-going program financing.

(*ix*) Equipment selection.

(*x*) Public and private sector involvement.

(*xi*) Site availability and selection.

(*xii*) Operating parameters such as PH and heat range.

(2) The director may promulgate rules as may be necessary to implement this section.

History: Add. 1988, Act 6, Imd. Eff. Feb. 8, 1988;—Am. 1988, Act 428, Imd. Eff. Dec. 27, 1988;--Am. 1989, Act 52, Imd. Eff. June 12, 1989.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.431 Rules implementing act; contents.

Sec. 31. Not later than September 11, 1979, the director shall submit to the legislature pursuant to Act No. 306 of the Public Acts of 1969, as amended, rules which contain sanitary design and operational standards for solid waste transporting units and disposal areas and otherwise implement this act. The rules shall include standards for hydrogeologic investigations; monitoring; liner materials; leachate collection and treatment, if applicable; groundwater separation distances; environmental assessments; methane gas control; soil erosion; sedimentation control; groundwater and surface water quality; noise and air pollution; and the use of floodplains and wetlands.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1979, Act 10, Imd. Eff. May 11, 1979.

Administrative rules: R 299.4101 et seq. and R 325.2701 et seq. of the Michigan Administrative Code.

299.432 State solid waste management plan; contents; duties of director.

Sec. 32. (1) The state solid waste management plan shall consist of the state solid waste plan developed under the resource recovery act, Act No. 366 of the Public Acts of 1974, being sections 299.301 to 299.321 of the Michigan Compiled Laws, and all county plans approved or prepared by the director.

(2) The director shall consult and assist in the preparation and implementation of the county solid waste management plans.

(3) The director may undertake or contract for studies or reports necessary or useful in the preparation of the state solid waste management plan.

(4) The director shall develop a strategy to encourage resource recovery and establishment of waste-to-energy facilities. Within 1 year of the effective date of the amendatory act that added this subsection, the director shall submit to the legislature a report on the details of the strategy. The report shall recommend public and private sector incentives and suggest potential regulatory relief to remove constraints on the siting of waste-to-energy and resource recovery facilities. The strategy and report shall be prepared with the goal of reducing land disposal to unusable residuals by the year 2005. The report shall include specific recommendations for necessary legislation to implement the strategy.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

299.432a Municipal solid waste incinerator ash; generation, transportation, treatment, storage, and disposal; regulation generally.

Sec. 32a. (1) Following the effective date of this section, the generation, transportation, treatment, storage, and disposal of municipal solid waste incinerator ash shall be regulated under this act as solid waste and shall not be regulated under the hazardous waste management act, Act No. 64 of the Public Acts of 1979, being sections 299.501 to 299.551 of the Michigan Compiled Laws.

(2) Except as provided in subsection (10), municipal solid waste incinerator ash shall be disposed of in 1 of the following:

(a) A landfill that meets all of the following requirements:

(*i*) The landfill is in compliance with this act and the rules promulgated under this act.

(*ii*) The landfill is used exclusively for the disposal of municipal solid waste incinerator ash.

(*iii*) The landfill design includes all of the following in descending order according to their placement in the landfill:

(A) A leachate collection system.

(B) A synthetic liner at least 60 mils thick.

(C) A compacted clay liner of 5 feet or more with a maximum hydraulic conductivity of 1×10^{-7} centimeters per second.

(D) A leak detection and leachate collection system.

(E) A compacted clay liner at least 3 feet thick with a maximum hydraulic conductivity of 1×10^{-7} centimeters per second or a synthetic liner at least 40 mils thick.

(b) A landfill that meets all of the following requirements:

(*i*) The landfill is in compliance with this act and the rules promulgated under this act.

(*ii*) The landfill is used exclusively for the disposal of municipal solid waste incinerator ash.

(*iii*) The landfill design includes all of the following in descending order according to their placement in the landfill:

(A) A leachate collection system.

(B) A synthetic liner at least 60 mils thick.

(C) A geotextile layer at least 100 mils thick.

(D) A synthetic liner at least 40 mils thick.

(E) A geotextile layer at least 100 mils thick.

(F) A leak detection and leachate collection system.

(G) A synthetic liner at least 40 mils thick.

(*iv*) The landfill's cells each hold a maximum of 100,000 cubic yards of municipal solid waste incinerator ash.

(*v*) If contaminants that may threaten the public health, safety, welfare, or the environment are found in the leachate collection system described in subparagraph (*iii*)(F), the owner or operator of the landfill shall determine the source and nature of the contaminants and shall make repairs, to the extent practicable, that will prevent the contaminants from entering the leachate collection system. If the director determines that the source of the contaminants is caused by a design failure of the landfill, the

director, notwithstanding an approved construction permit or operating license, may require landfill cells at that landfill that will be used for the disposal of municipal solid waste incinerator ash, which are under construction or will be constructed in the future at the landfill, to be constructed in conformance with improved design standards approved by the director. However, this subdivision shall not be construed to require the removal of liners or leak detection and leachate collection systems that are already in place in a landfill cell under construction.

(*vi*) On the effective date of this section, the owner or operator of the landfill has a letter of agreement with an existing municipal solid waste incinerator to receive municipal solid waste incinerator ash, and the owner or operator has within 90 days after the effective date of this section submitted this letter to the director.

(c) A landfill that meets all of the following requirements:

(*i*) The landfill is in compliance with this act and the rules promulgated under this act.

(*ii*) The landfill is used exclusively for the disposal of municipal solid waste incinerator ash.

(*iii*) The landfill design includes all of the following in descending order according to their placement in the landfill:

(A) A leachate collection system.

(B) A synthetic liner at least 80 mils thick.

(C) At the option of the owner or operator of the landfill, a leak detection and leachate collection system.

(D) At least 10 feet of either natural or compacted clay with a maximum hydraulic conductivity of 1×10^{-7} centimeters per second.

(*iv*) If construction of the landfill begins prior to June 1, 1990, the liner specified in subdivision (c)(*iii*)(B) may be 60 mils thick.

(d) A landfill with a design approved by the director that will prevent the migration of any hazardous constituent into the groundwater or surface water at least as effectively as the design requirements of subdivisions (a) to (c).

(e) A type II landfill, as defined in R 299.4105, if all of the following occur:

(*i*) The ash was generated by a municipal solid waste incinerator that is designed to burn at a temperature in excess of 2500 degrees Fahrenheit.

(*ii*) The ash is tested by a laboratory listed on the list compiled by the department under section 32c and the ash, upon testing, meets the requirements of 40 C.F.R. 261.20 to 261.24. A person seeking to dispose of ash under this subdivision may select an approved laboratory from the list compiled in section 32c to conduct the test.

(*iii*) The ash from any individual municipal solid waste incinerator is disposed of pursuant to this subdivision for a period not to exceed 60 days.

(3) Except as provided in subsection (5), a landfill that is constructed pursuant to the design described in subsection (2)(a) or (b) shall be capped following its closure by all of the following in descending order:

(a) Six inches of top soil with a vegetative cover.

(b) Two feet of subsurface drainage media or cobbles or a combination thereof to protect against animal burrowing, temperature, erosion, and rooted vegetation.

(c) A flexible membrane liner at least 30 mils thick.

(d) 3 feet of compacted clay with a maximum hydraulic conductivity of 1×10^{-7} centimeters per second.

(e) A synthetic liner at least 30 mils thick with a geomembrane infiltration system above the liner may be used in place of the compacted clay specified in subdivision (3)(d) if on the effective date of this section the owner or operator of the landfill has a letter of agreement with an existing municipal solid waste incinerator to receive municipal solid waste incinerator ash, and the owner or operator has within 90 days after the effective date of this subsection submitted this letter to the director.

(4) Except as provided in subsection (5), a landfill that is constructed pursuant to the design described in subsection (2)(c) shall be capped following its closure by all of the following in descending order:

(a) Six inches of top soil with a vegetative cover.

(b) Two feet of compacted clay with a maximum hydraulic conductivity of 1×10^{-7} centimeters per second of compacted clay.

(c) An infiltration collection system.

(d) A synthetic liner at least 30 mils thick.

(e) One foot of compacted clay with a maximum hydraulic conductivity of 1×10^{-7} centimeters per second.

(5) A landfill that receives municipal solid waste incinerator ash under this section may be capped with a design approved by the director that will prevent the migration of any hazardous constituent into the groundwater or surface water at least as effectively as the design requirements of subsections (3) and (4).

(6) If leachate is collected from a landfill under this section, the leachate shall be monitored and tested in accordance with this act and the rules promulgated under this act.

(7) Prior to and after the effective date of this section, notwithstanding any other provision in this section, municipal solid waste incinerator ash may be stored or may continue to be stored on a temporary basis if all of the following occur:

(a) The ash is stored in a landfill licensed under this act.

(b) The owner or operator of the landfill, within 90 days of the effective date of this section, does either of the following:

(*i*) Applies for an operating permit amendment pursuant to subsection (11) that would allow the permanent disposal of the ash at the landfill.

(*ii*) Applies for a construction permit under this act that would allow the permanent disposal of the ash at the landfill.

(c) The ash is stored for not longer than 9 months after an operating license or an operating license amendment is approved or denied by the director, or 24 months after the effective date of this section, whichever occurs first, unless the director has unreasonably delayed approving or denying an operating license or operating license amendment.

(d) On the effective date of this section, the owner or operator of the landfill has a letter of agreement with an existing municipal solid waste incinerator or with a municipal solid waste incinerator under construction to receive municipal solid waste incinerator ash, and the owner or operator has within 90 days after the effective date of this section submitted this letter to the director.

(e) The temporary storage at the landfill provides for an intermediate separation of the ash from other solid waste using not less than 2 feet of compacted soil or a synthetic liner at least 30 mils thick and the ash is covered daily in a manner that prevents the ash from blowing.

(f) Within 90 days after the effective date of this section or prior to beginning temporary storage, the owner or operator of the landfill receiving the municipal solid waste incinerator ash submits an ash management plan to the director that includes leachate and runoff control measures and dust control measures. The director shall approve or disapprove the plan submitted under this subsection within 30 days of receiving it. If the director disapproves the plan, he or she shall notify the owner or operator submitting the plan of this fact, and shall provide modifications that, if included, would result in the plan's approval. If the director disapproves a plan, the owner or operator of the landfill shall within 30 days after receipt of the director's disapproval submit a revised plan that addresses all of the modifications provided by the director. The director shall approve or disapprove the revised plan within 30 days of receiving it, and approval of the revised plan shall not be unreasonably withheld. Upon approval by the director, the plan shall become part of the operating license of the landfill. The operation of a landfill without an approved plan under this subdivision shall subject the owner or operator, or both, to all of the sanctions provided by this act.

(g) Within 30 days after the effective date of this section or prior to receiving the ash for temporary storage, the owner or operator of the landfill notifies the governing body of the municipality and the county board of commissioners of the county in which the landfill is located of its intent to temporarily store the ash.

(8) Following a period of temporary storage under subsection (7), municipal solid waste incinerator ash shall be permanently disposed of in accordance with this section. In addition to any other penalty provided in this act, a person who stores municipal solid waste incinerator ash under subsection (7) for a period longer than is allowed by subsection (7) is liable for a civil fine of $5,000.00 per day of violation.

(9) The owner or operator of a landfill that receives municipal solid waste incinerator ash under this section for temporary storage or for disposal shall do all of the following:

(a) Manage the ash to control dust.

(b) Manage the landfill to control track out.

(c) Manage all access roads within the landfill to control dust.

(d) Only dispose of wet ash in the landfill.

(e) If the ash was in temporary storage under subsection (7), rewet the ash prior to transporting the ash to the permanent landfill.

(10) As an alternative to disposal described in subsection (2), the owner or operator of a municipal solid waste incinerator may process municipal solid waste incinerator ash through mechanical or chemical methods, or both, to substantially diminish the toxicity of the ash or its constituents or limit the leachability of the ash or its constituents to minimize threats to human health and the environment, if processing is performed on the site of the municipal solid waste incinerator or at the site of a landfill described in subsection (2); the process has been approved by the director as provided by rule; and the ash is tested after processing in accordance with a protocol approved by the director as provided by rule. The director shall approve the process and testing protocol under this subsection only if the process and testing protocol will protect human health and the environment. In making this determination, the director shall consider all potential pathways of human and environmental exposure, including both short-term and long-term, to constituents of the ash that may be released during the reuse or recycling of the ash. The director shall consider requiring methods to determine the leaching, total chemical analysis, respirability, and toxicity of reused or recycled ash. A leaching procedure shall include testing under both acidic and native conditions. If municipal solid waste incinerator ash is processed in accordance with the requirements of this subsection and the processed ash satisfies the testing protocol approved by the director as provided by rule, the ash may be disposed of in a type II landfill, as defined by R 299.4105 of the Michigan administrative code, licensed under this act or may be used in any manner approved by the director. If municipal solid waste incinerator ash is processed as provided in this subsection, but does not satisfy the testing protocol approved by the director as provided by rule, the ash shall be disposed of in accordance with subsection (2).

(11) The disposal of municipal solid waste incinerator ash within a landfill that is in compliance with subsection (2) shall not constitute a new proposal for which a new construction permit is required under section 11, if a construction permit has previously been issued under section 10 for the landfill and the owner or operator of the landfill submits 6 copies of an operating license amendment application to the director for approval. The operating license amendment application shall include revised plans and specifications for all facility modifications including a leachate disposal plan, an erosion control plan, and a dust control plan which shall be part of the operating license amendment. The dust control plan shall contain sufficient detail to ensure that dust emissions are controlled by available control technologies that reduce dust emissions by a reasonably achievable amount to the extent necessary to protect human health and the environment. The dust control plan shall provide for the ash to be wet during all times that the ash is exposed to the

atmosphere at the landfill or otherwise to be covered by daily cover material; for dust emissions to be controlled during dumping, grading, loading, and bulk transporting of the ash at the landfill; and for dust emissions from access roads within the landfill to be controlled. With the exception of a landfill that is in existence on the effective date of this section that the director determines is otherwise in compliance with this section, the owner or operator of the landfill shall obtain the operating license amendment prior to initiating construction. Prior to operation, the owner or operator of a landfill shall submit to the director or the director's designee certification from a licensed professional engineer that the landfill has been constructed in accordance with the approved plan and specifications. At the time the copies are submitted to the director, the owner or operator of the landfill shall send a copy of the operating license amendment application to the municipality where the landfill is located. At least 30 days prior to making a final decision on the operating license amendment, the director shall hold at least 1 public meeting in the vicinity of the landfill to receive public comments. Prior to a public meeting, the director shall publish notice of the meeting in a newspaper serving the local area. The director shall issue a final decision on an operating license amendment application within 120 days after the director receives an administratively complete application.

(12) Once every other month, the owner or operator of a municipal solid waste incinerator shall collect a 24-hour composite sample of the municipal solid waste incinerator ash generated by the incinerator. Within 30 days after the effective date of this section, the owner or operator of a municipal solid waste incinerator shall submit a protocol for sample collection to the director for approval. Each sample shall be collected according to the approved protocol. The owner or operator shall perform an analysis of the collected sample for trace metals as totals by acid digestion using analytical methods described in SW-846 "test methods for evaluating solid waste, third edition". The purpose of these tests is to determine the changes in characteristics of municipal solid waste incinerator ash from source separation initiatives over the life of the facility. If fly ash generated by the municipal solid waste incinerator is processed separately from the bottom ash, the owner or operator shall perform separate tests on the fly ash and the bottom ash. The owner or operator of the municipal solid waste incinerator shall submit these test results to the director within 60 days after the sample was collected.

(13) The owner or operator of a municipal solid waste incinerator or a disposal area that receives municipal solid waste incinerator ash shall allow the director or an agent or employee of the director access to the facility for the purpose of supervising the collection of samples or obtaining samples of ash to test or to monitor air quality at the facility.

(14) As used in subsection (2), "landfill" means a landfill or a specific portion of a landfill.

History: Add. 1989, Act 52, Imd. Eff. June 12, 1989.

Compiler's note: The power of seven in the equation "1 x 10^{7}" should read the power of negative seven (one times ten to the power of negative seven).

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.432b Municipal solid waste incinerator ash; transportation.

Sec. 32b. (1) If municipal solid waste incinerator ash is transported, it shall be transported in compliance with section 720 of the Michigan vehicle code, Act No. 300 of the Public Acts of 1949, being section 257.720 of the Michigan Compiled Laws.

(2) If municipal solid waste incinerator ash is transported by rail, it shall be transported in covered, leak proof railroad cars.

(3) The outside of all vehicles and accessory equipment used to transport municipal solid waste incinerator ash shall be kept free of the ash.

History: Add. 1989, Act 52, Imd. Eff. June 12, 1989.

299.432c List of laboratories capable of performing test provided for in § 299.432a (2)(e); compilation; publication; definitive testing; fraudulent or careless testing.

Sec. 32c. (1) The department shall compile a list of approved laboratories that are capable of performing the test provided for in section 32a(2)(e).

(2) The department shall publish the list compiled under subsection (1) on or before July 1, 1989, and shall thereafter make the list available to any person upon request.

(3) Except as provided in subsection (4), a test conducted by an approved laboratory from the list compiled under subsection (1) is definitive for purposes of this act.

(4) If the department has reason to believe that test results provided by an approved laboratory are fraudulent or that a test was carelessly performed, the department may conduct its own test, or may have an additional test performed at the department's expense.

History: Add. 1989, Act 52, Imd. Eff. June 12, 1989.

299.433 Action for appropriate relief; penalties for violation or noncompliance; construction of act.

Sec. 33. (1) The director or a health officer may request that the attorney general bring an action in the name of the people of the state, or a municipality or county may bring an action based on facts arising within its boundaries, for any appropriate relief, including injunctive relief, for a violation of this act or rules promulgated pursuant to this act.

(2) In addition to any other relief provided by this section, the court may impose on any person who violates any provision of this act or rules promulgated under this act or fails to comply with any permit, license, or final order issued pursuant to this act a civil fine of not more than $10,000.00 for each day of violation.

(3) In addition to any other relief provided by this section, the court may order a person violating this act or the rules promulgated under this act either to restore or to pay to the state an amount equal to the cost of restoring the natural resources of this state affected by the violation to their original condition before the violation, and to pay to the state the costs of surveillance and enforcement incurred by the state as a result of the violation.

(4) This act shall not be construed to preclude any person from commencing a civil action based on facts which may also constitute a violation of this act or the rules promulgated under this act.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1979, Act 10, Imd. Eff. May 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.434 Grant program; establishment; purpose; interlocal agreements; separate planning grant; appropriation; use of grant funds by director; rules; financial assistance to certified health department.

Sec. 34. (1) In order for a county to effectively carry out the planning responsibilities designated under this act, a grant program is established to provide financial assistance to county or regional solid waste management planning agencies. Municipalities joined together with interlocal agreements relating to solid waste management plans, within a county having a city of a population of more than 1 million, shall be eligible for a separate planning grant in addition to those granted to counties. This separate grant allocation provision shall not alter the planning and approval process requirements for county plans as specified in this act. Eighty percent of the money for the program not provided for by federal funds shall be appropriated annually by the legislature from the general fund of the state and 20% shall be appropriated by the applicant. Grant funds appropriated for local planning may be used by the director if the director finds it necessary to invoke the director's authority to develop a local plan under section 25(6). The director shall promulgate rules for the distribution of the appropriated funds.

(2) In order for a certified health department to effectively carry out the responsibilities designated under this act, an annual grant shall be appropriated by the legislature from the general fund of the state to provide financial assistance to a certified health department. A certified health department shall be eligible to receive 100% of reasonable personnel costs as determined by the department based on criteria established by rule. The director shall promulgate rules for the distribution of the appropriated funds.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.435 Private sector; legislative intent; salvaging not prohibited.

Sec. 35. (1) This act is not intended to prohibit the continuation of the private sector from doing business in solid waste disposal and transportation. This act is intended to encourage the continuation of the private sector in the solid waste disposal and transportation business when in compliance with the minimum requirements of this act.

(2) This act is not intended to prohibit salvaging.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

299.436 Violation as misdemeanor; penalty; separate offenses.

Sec. 36. A person who violates this act, a rule promulgated under this act or a condition of a permit, license, or final order issued pursuant to this act is guilty of a misdemeanor, punishable by a fine of not more than $1,000.00 for each violation and costs of prosecution and, if in default of payment of fine and costs, imprisonment for not more than 6 months. Each day upon which a violation occurs shall be considered a separate offense.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979;--Am. 1987, Act 209, Eff. Mar. 30, 1988.

Administrative rules: R 299.4101 et seq. of the Michigan Administrative Code.

299.437 Repeal of §§ 325.291 to 325.300.

Sec. 37. Act No. 87 of the Public Acts of 1965, as amended, being sections 325.291 to 325.300 of the Compiled Laws of 1970, is repealed.

History: 1978, Act 641, Imd. Eff. Jan. 11, 1979.

APPENDIX F

EXCERPTS FROM PLAN APPROVAL RESOLUTIONS

EXCERPTS FROM THE MINUTES
OF THE
SOLID WASTE PLANNING COMMITTEE
MEETING OF APRIL 5, 1990

MOTION TO APPROVE STAFF RECOMMENDED CHANGES TO PLAN UPDATE:

It was moved by Larry Pernick, supported by Jerome Amber, to approve recommended changes to Plan Update in accordance with Staff recommendations to have a shorter contract time, not to exceed 10 years, for sufficient private/public sector landfill capacity, in order to satisfy bond underwriter requirements.

Motion passed on a voice vote.

MOTION TO APPROVE RECIPROCAL AGREEMENTS WITH ADJACENT COUNTIES THAT DEMONSTRATE LANDFILL CAPACITY:

It was moved by Bob Seccombe, supported by JoAnn Van Tassel, that we require the adjacent communities to demonstrate that they have landfill capacity within their borders to reciprocate landfill capacity. Motion passed on a voice vote.

MOTION TO DELETE "40-YEAR LANDFILL CAPACITY" REFERENCE IN THE PLAN UPDATE:

It was moved by Bob Seccombe and supported by David Stinson to delete the phrase "40-year" landfill capacity reference in the Plan Update. Motion passed on a voice vote.

MOTION TO APPROVE 20-YEAR LANDFILL CAPACITY SITE:

It was moved by Ron Baker and supported by Jerome Amber to approve a County-owned landfill as part of a landfill system that does not exceed a 20-year capacity (total system does not exceed 20-years). Motion passed on a voice vote.

MOTION TO DELETE HOLLY DISPOSAL SITE FROM PLAN UPDATE:

It was moved by John King and supported by Lenora Jadun to drop the Holly Disposal Site from the Plan Update.

Roll Call Vote:

Yeas: Meenahan, King, Jadun, Pernick, Ryan, Seccombe, Stinson, Van Tassel, Waffen

Nays: Amber, Baker, Madias, Moore

Motion passed on a Roll Call Vote.

MOTION TO DELETE HOLLOWAY DISPOSAL SITE FROM PLAN UPDATE:

It was moved by Lenora Jadun and supported by Bob Seccombe to delete the Holloway Disposal Site in Novi Township from the Plan Update.

Roll Call Vote:

Yeas: Meenahan, Baker, King, Jadun, Madias, Moore, Pernick, Ryan, Seccombe, Stinson, Van Tassel, Waffen

Nays: Amber

Motion passed on a Roll Call Vote.

MOTION TO CHANGE WATERFORD HILLS FROM A TYPE II DISPOSAL SITE TO A TYPE III AS STATED IN ORIGINAL PLAN:

It was moved by Bob Seccombe and supported by Larry Pernick to change the Waterford Hills designation from Type II to Type III Landfill as stated in original Plan.

Roll Call Vote:

Yeas: Meenahan, Amber, Baker, King, Madias, Moore, Pernick, Seccombe, Stinson, Van Tassel, Waffen

Nays: Jadun, Ryan

Motion passed on a Roll Call Vote.

MOTION TO AMEND "COUNTY EXECUTIVE APPROVAL" TO INCLUDE "COUNTY EXECUTIVE STAFF REVIEW WITH BOARD OF COMMISSIONERS FINAL APPROVAL":

It was moved by Larry Pernick and supported by John King to have the County Executive Staff review the sites and forward information to the Board of Commissioners for final approval.

Roll Call Vote:

Yeas: Meenahan, Amber, Baker, Jadun, King, Madias, Moore, Pernick, Ryan, Seccombe, Stinson, Van Tassel, Waffen

Nays: None

Motion passed on a Roll Call Vote.

EXCERPTS FROM THE MINUTES
OF THE
SOLID WASTE PLANNING COMMITTEE
MEETING OF APRIL 25, 1990

MOTION TO DELETE TWO PROPOSED SITES FOR THE RRRASOC RECYCLING/ TRANSFER FACILITY/HOUSEHOLD HAZARDOUS WASTE DROP OFF SITES FROM THE PLAN UPDATE:

It was moved by Lenora Jadun, supported by Ted Starbuck, to delete the following described sites from Pages 8-9 and 8-10 of the Act 641 Update Plan.

Approximately 20 acres located on the west side of Telegraph, approximately one-quarter mile north of Eight Mile Road, City of Southfield, and

Approximately 21 acres located on the east side of Wixom Road, approximately one mile north of I-696, City of Wixom.

The following two sites will remain in the Plan Update until final selection has been made by RRRASOC:

Approximately 25 acres located on the west side of Wixom Road, approximately one-quarter mile south of Grand River Avenue, City of Novi, and

Approximately 30 acres located on the west side of Haggerty Road, approximately one-quarter mile north of Grand River Avenue, City of Novi.

Upon further discussion, motion was amended with the following addition:

Upon final site selection by RRRASOC, the remaining site will automatically be dropped from the Plan Update.

Motion passed on a voice vote.

MOTION TO PROVIDE FOR INCLUSION OF THE CONCEPT OF MRFs TO PROCESS MIXED WASTE IN THE PLAN UPDATE:

It was moved by JoAnn Van Tassel, supported by Tom Waffen, that the S.W.P.C. endorse the concept of allowing a municipality to elect to participate, either in a source-separated MRF or in a mixed waste MRF, at their discretion, and have the necessary wording added to the Plan to accomplish that.

Motion passed on a voice vote

MOTION TO TAKE AFFIRMATIVE ACTION TO DISCOURAGE THE ABOVE-GROUND STORAGE OR LAND DISPOSAL OF WHOLE TIRES:

It was moved by John King, supported by JoAnn Van Tassel, that Oakland County should take affirmative action to discourage the above-ground storage or land disposal of whole tires, by requiring the use of shredding, splitting, pulverizing, cryogenic treatment, or other methods to improve the recycling and marketability of used tires. Oakland County should thoroughly enforce existing legislation regarding the nuisance or fire hazard of above-ground storage of whole tires.

Mr. Meenahan called for a recess to discuss technical points of the motion.

Meeting reconvened at 9:20 P.M. Discussion followed which amended the motion to read "on or in the ground" storage.

Motion passed on a voice vote.

MOTION TO INCLUDE GOALS AND OBJECTIVES IN EXECUTIVE SUMMARY OF PLAN UPDATE:

It was moved by JoAnn Van Tassel, supported by Mary Shaw Moore, to include the Goals and Objectives from Section 8.6 in the Executive Summary.

Motion passed on a voice vote.

MOTION TO REMOVE CLARKSTON DISPOSAL RECYCLING/TRANSFER FACILITY FROM THE COUNTY PLAN UPDATE:

It was moved by JoAnn Van Tassel to have the Clarkston Disposal Recycling/Transfer Facility removed from the County Plan, Page 8-10. Motion failed for lack of a second.

MOTION TO TABLE DISCUSSION ON REMOVING CLARKSTON DISPOSAL RECYCLING/TRANSFER FACILITY FROM THE PLAN UPDATE UNTIL MORE INFORMATION IS AVAILABLE:

It was moved Lenora Jadun to table the discussion on Clarkston Disposal Recycling/Transfer Facility until more information is available. Motion failed for lack of second.

MOTION TO AMEND PLAN UPDATE, PAGE 8-10, CLARKSTON DISPOSAL RECYCLING/TRANSFER FACILITY:

It was moved by JoAnn Van Tassel, supported by Lenora Jadun, to amend the Plan Update under the reference to the Clarkston Disposal Recycling/Transfer Facility, (Springfield Area), Page 8-10, to read "not designated as site specific on Page 8-11".

It was moved by Mary Shaw Moore, supported by John King, to address this issue at the S.W.P.C. May 10, 1990 Meeting. Motion passed on a voice vote.

MOTION TO DELETE 57 ACRES FROM PROPOSED SOCRRA LANDFILL, ROCHESTER HILLS (PAGE 8-8):

It was moved by JoAnn Van Tassel, supported by John King, to delete the proposed expansion to the SOCRRA Landfill, Page 8-8, first paragraph, that portion that reads "(plus 57 acres north of Avon Road for disposal of ash from SOCRRA's waste-to-energy facility)".

Roll Call Vote:

Yeas: John King, Mary Shaw Moore, JoAnn Van Tassel

Nays: Jim Meenahan, Jerome Amber, Ron Baker, Lenora Jadun, Nick Madias, Larry Pernick, Ted Starbuck, David Stinson, Thomas Waffen

Motion failed.

EXCERPTS FROM THE MINUTES
OF THE
SOLID WASTE PLANNING COMMITTEE
MEETING OF MAY 10, 1990

MOTION TO APPROVE RECOMMENDATION OF STAFF ON CLARKSTON DISPOSAL, INC.:

It was moved by JoAnn Van Tassel, supported by Bob Seccombe to approve the recommendation by Staff that the reference to Clarkston Disposal, Inc. on Page 8-10 of the Plan Update which reads:

Clarkston Disposal Recycling/Transfer Facility
Approximately 7.67 acres located at Crosby Lake Road and Andersonville Road in Springfield Township;

should be changed to Page 8-11 to read:

Clarkston Disposal Recycling/Transfer Facility
Springfield Township Area

Roll Call Vote:

Yeas: John King, Lenora Jadun, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Jim Meenahan

Nays: Ron Baker, Nick Madias, Thomas Waffen

Motion passed.

MOTION TO LEAVE LAIDLAW TRANSFER STATION DESIGNATION AS IT IS PRESENTLY IN THE ACT 641 PLAN:

It was moved by JoAnn Van Tassel, supported by Dave Stinson to leave the Laidlaw Transfer Station designation as it is presently in the Act 641 Plan.

Roll Call Vote:

Yeas: Thomas Waffen, James Meenahan, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel

Nays: None

Motion passed.

MOTION TO ACCEPT THE CITY OF PONTIAC'S RESOLUTION TO CLARIFY MRF FACILITY AND ADD TRANSFER STATION DESIGNATION TO PROPOSED SITE:

It was moved by John King, supported by Thomas Waffen, to accept the City of Pontiac's Resolution for clarification of the City's MRF and to add the Transfer Station designation.

Proposed Resolution:

WHEREAS, th Solid Waste Planning Committee approved the City of Pontiac's MRF for plan update inclusion at its meeting on December 7, 1989, and

WHEREAS, it is advisable to clarify that the MRF will be a regulated solid waste disposal area under the Solid Waste Management Act and may conduct activities included within the definition of a "disposal area' in the Solid Waste Management Act, except for the operation of an incinerator or sanitary landfill.

NOW, THEREFORE, be it resolved, that the previous approval of the City of Pontiac MRF for plan update inclusion recognizes the regulatory treatment of the area as a "disposal area" within the meaning of the Solid Waste Management Act and all activities included therein, with the exception of the operation of an incinerator or sanitary landfill.

Roll Call Vote:

Yeas: None

Nays: James Meenahan, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Motion failed.

MOTION TO AMEND PLAN UPDATE TO INCLUDE LANGUAGE SIMILAR TO CURRENT PLAN TO STATE THAT IF A MUNICIPALITY ALREADY HAS ONE WASTE DISPOSAL FACILITY THEY DO NOT GET A SECOND ONE OR AN EXPANSION OF THE FIRST WITHOUT APPROVAL OF LOCAL GOVERNMENTAL UNIT:

It was moved by JoAnn Van Tassel, supported by Lenora Jadun, to amend the Plan Update to include language similar to the current Plan to state that if a municipality already has one waste disposal facility they do not get a second one or an expansion of the first without approval of local governmental unit (Section 1.4.11, Page 1-13 of newest Update).

Roll Call Vote:

Yeas: Lenora Jadun, Nick Madias, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Jim Meenahan

Nays: Jerome Amber, Ron Baker, John King, Mary Shaw Moore, Thomas Waffen

Motion passed.

MOTION TO INCLUDE EXCERPT FROM ST. CLAIR COUNTY PLAN AS IT REGARDS "STANDARDS" TO BE FOLLOWED FOR SITE SELECTION WHICH WOULD BECOME PART OF THE OAKLAND COUNTY PLAN IF AGREED UPON BY THE BOARD OF COMMISSIONERS:

It was moved by David Stinson, supported by JoAnn Van Tassel to include the excerpt from the St. Clair County Plan regarding "Standards" to be followed for site selection which would become part of the plan if agreed to by the Board of Commissioners.

Roll Call Vote:

Yeas: Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen, Jim Meenahan, Lenora Jadun, Ron Baker, John King

Nays: Jerome Amber

Motion passed.

MOTION TO REMOVE BFI/MARLOWE SITE FROM PLAN UPDATE AND TO HAVE IT GO THROUGH THE CRC AT A LATER DATE:

It was moved by David Stinson, supported by JoAnn Van Tassel to remove the BFI/Marlowe Site from the Plan Update and to have it go through the CRC at a later date.

Roll Call Vote:

Yeas: Mary Shaw Moore, Larry Pernick, David Stinson, JoAnn Van Tassel

Nays: Jim Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Bob Seccombe, Ted Starbuck, Thomas Waffen

Motion failed.

MOTION TO APPROVE THE PLAN UPDATE TO THE SOLID WASTE MANAGEMENT PLAN FOR OAKLAND COUNTY, MICHIGAN, AS AMENDED:

It was moved by John King, supported by Jerome Amber, that the "Draft Update to Solid Waste Management Plan for Oakland County, Michigan", dated 1989, as amended by the Solid Waste Planning Committee in response to comments received at the public hearing on the Draft Update and during the public comment period on the Draft Update, is hereby approved by the Solid Waste Planning Committee. The Solid Waste Planning Committee recommends that the Draft Update be forwarded to the Oakland County Board of Commissioners for their approval.

Roll Call Vote:

Yeas: James Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, Thomas Waffen

Nays: JoAnn Van Tassel

Motion passed.

EXCERPTS FROM
OAKLAND COUNTY
BOARD OF COMMISSIONERS
MEETING
OF
May 31, 1990

The Chairperson stated the Review of Act 641 - "Solid Waste Plan Update" was before the Board for amendment and/or adoption.

Moved by Skarritt supported by Huntoon the BFI/Marlowe Landfill Site be removed from the Plan.

The Chairperson declared a 5 minute recess. The Board reconvened at 11:20 A.M.

Discussion on the proposed amendment followed.

Votes on amendment:
AYES: Caddell, Gosling, Huntoon, Jensen, Johnson, R. Kuhn, Law, Luxon, McPherson, Moffitt, Oaks, Pernick, Price, Skarritt, Bishop. (15)
NAYS: Calandro, Chester, Crake, Ferrens, McConnell, McCulloch, Olsen, Pappageorge, Rewold, Wolf. (10)

A sufficient majority having voted therefor, the amendment carried.

Moved by McCulloch supported by Calandro to include the Marlowe Landfill Site in the 641 Plan contingent on entry of a consent judgement satisfactory to DNR and the Oakland County Board of Commissioners which provides the complete mediation of the Marlowe Landfill Site.

Mr. Bishop stated the amendment was out of order. The Chairperson ruled the amendment in order.

Mr. Bishop challenged the decision of the Chair.

The Chairperson stated it takes 3/4 vote to override the decision of the Chair. A "AYE" vote will sustain the decision of the Chair.

AYES: Calandro, Chester, Crake, Jensen, Johnson, R. Kuhn, McConnell, McCulloch, Olsen, Pappageorge, Pernick, Price, Rewold, Wolf, Caddell. (15)
NAYS: Ferrens, Gosling, Huntoon, Law, Luxon, McPherson, Moffitt, Oaks, Skarritt, Bishop. (10)

A sufficient majority NOT having voted therefor, the decision of the Chair was sustained.

The Chairperson stated Mr. McCulloch's amendment was before the Board for consideration.

Discussion followed.

The Chairperson vacated the Chair. Vice Chairperson Nancy McConnell took the Chair.

Vote on amendment:
AYES: Crake, Jensen, McConnell, McCulloch, Olsen, Pappageorge, Rewold, Wolf, Calandro. (9)
NAYS: Chester, Ferrens, Gosling, Huntoon, Johnson, R. Kuhn, Law, Luxon, McPherson, Moffitt, Oaks, Pernick, Price, Skarritt, Bishop, Caddell. (16)

A sufficient majority NOT having voted therefor, the amendment failed.

Moved by Rewold supported by Richard Kuhn to remove the expansion of Eagle Valley from the Plan.

AYES: Gosling, Huntoon, Johnson, R. Kuhn, Law, Oaks, Price, Rewold, Skarritt, Bishop. (10)
NAYS: Crake, Ferrens, Jensen, Luxon, McConnell, McCulloch, McPherson, Olsen, Pappageorge, Pernick, Wolf, Caddell, Calandro, Chester. (14)

A sufficient majority NOT having voted therefor, the amendment failed.

Moved by Rewold supported by McPherson that any Host Community be reimbursed for being a Host Community on a fee basis or whatever it may be, but at least to sit down and negotiate with the communities whether it be a MERF Waste-to-Energy Facility, Landfill or whatever.

The Vice Chairperson referred the motion to the Planning and Building Committee.

Mr. Bishop objected to the referral, supported by Pappageorge.

Mr. Bishop stated since this was not mentioned in the Plan, the oversight should be referred to the 641 Committee and not the Planning and Building Committee. The 641 Plan, as presently before the Board does not speak to Host Communities fees, and therefore he would like that objection noted.

Discussion followed.

Moved by Gosling supported by Olsen the motion be amended to include after "Host Communities" the words "and contiguous affected communities."

A sufficient majority NOT having voted therefor, the amendment to the motion failed.

Moved by Rewold supported by Olsen the Plan be amended to state that the Host Community fees should be conceptually discussed in the Plan outlining consideration which would form the basis for such fees.

Discussion followed.

Vote on amendment:
AYES: Gosling, Johnson, R. Kuhn, Luxon, McConnell, McPherson, Pappageorge, Price, Rewold, Skarritt, Wolf, Bishop, Chester. (13)
NAYS: Ferrens, Huntoon, Jensen, Law, McCulloch, Moffitt, Oaks, Olsen, Pernick, Caddell, Calandro, Crake. (12)

A sufficient majority having voted therefor, the amendment carried.

Moved by Johnson supported by McPherson the 641 Committee take a look at property contiguous to the landfill and the people be compensated for a loss of property value.

AYES: Gosling, Huntoon, Johnson, R. Kuhn, Luxon, McConnell, McPherson, Oaks, Pernick Price, Rewold, Skarritt, Bishop, Chester. (14)
NAYS: Jensen, Law, McCulloch, Moffitt, Olsen, Pappageorge, Wolf, Caddell, Calandro, Crake. (10)

A sufficient majority having voted therefor, the motion carried.

Moved by Johnson supported by Huntoon that at the bottom of page 8-25, the last sentence (after "consultation with the Oakland County Solid Waste Department and Citizens Review Committee Chairperson, the County Executive) add "with the consent of the Board of Commissioners"; who will appoint representatives from the affected and adjacent communities.

A sufficient majority having voted therefor, the amendment carried.

Moved by Olsen supported by Pappageorge the Plan be amended in Sec. 8.8.1 IMPLEMENTATION LEGISLATION (second sentence):
The present language says "For any bonds issued to finance the facilities, the County shall pledge its full faith and credit."
The proposed language will be "The system will be self supporting through revenues generated by waste delivered to the various system components to pay bondholders for any bonds issued to finance the facilities."

A sufficient majority having voted therefor, the amendment carried.

Moved by Chester supported by McPherson the Plan be amended to remove the SOCRRA Incinerator from the County Plan.

Discussion followed.

AYES: Huntoon, Johnson, Luxon, McPherson, Moffitt, Oaks, Price, Bishop, Chester, Gosling.(10)
NAYS: Jensen, R. Kuhn, McConnell, McCulloch, Olsen, Pappageorge, Pernick, Rewold, Skarritt, Wolf, Caddell, Calandro, Crake. (13)

A sufficient majority NOT having therefor, the amendment failed.

Moved by Bishop supported by McConnell the plan be amended to remove SOCRRA Landfill in Rochester Hills (page 8-8 of plan).

AYES: Johnson, R. Kuhn, McConnell, McPherson, Moffitt, Oaks, Rewold, Skarritt, Bishop, Chester, Crake, Gosling, Huntoon. (13)
NAYS: Jensen, Luxon, McCulloch, Olsen, Pappageorge, Pernick, Price, Wolf, Caddell, Calandro. (10)

A sufficient majority having voted therefor, the amendment carried.

Mr. Wolf stated he had voted on the removal of the SOCRRA Landfill from the plan (he voted NAY) and he would like it noted in the minutes he should have abstained from voting because of a possible conflict of interest.

Moved by Price supported by Pernick that all financial concern of oversight responsibility be referred to the Finance Committee and those that concern the Planning and Building Committee be referred to that committee.

The Chairperson stated the referrals have to be referred directly to the 641 Committee.

Mr. Price stated the Board could refer if they wish to, and requested a roll call vote on the motion to refer.

AYES: R. Kuhn, Law, Luxon, McPherson, Oaks, Pernick, Price. (7)
NAYS: Johnson, McConnell, McCulloch, Moffitt, Olsen, Pappageorge, Rewold, Skarritt, Wolf, Bishop, Caddell, Calandro, Chester, Crake, Gosling, Huntoon, Jensen. (17)

A sufficient majority NOT having voted therefor, the motion to refer failed.

Moved by Pappageorge supported by Moffitt to include the site selection criteria as an appendex for our plan, and it go to the 641 Committee to consider.

A sufficient majority having voted therefor, the motion carried.

Moved by Skarritt supported by Johnson on the 4th line of page 8-38, sec. 8.5.12 (COUNTY BOARD ACTION), after "of all criteria" add "by affirmative action of" the Board finds the proposed site.....

A sufficient majority having voted therefor, the amendment carried.

Moved by Skarritt supported by Johnson the plan be amended on page 8-38, the first paragraph on the page, in the next to last line after "if there is clear and convincing evidence" add "beyond a reasonable doubt." Also under Sec. 8.5.12, the next to last line add the same "beyond a reasonable doubt" after "clear and convincing evidence.

A sufficient majority having voted therefor, the amendment carried.

The Chairperson declared a 15 minute recess for the Board to compile all amendments into a resolution and present to the Board for adoption.

The Board reconvened at 2:25 P.M.

The Chairperson stated the 641 Plan was before the Board.

Mr. Crake presented the following resolution:

Misc. 90126
By Larry P. Crake
IN RE: UPDATE OF OAKLAND COUNTY SOLID WASTE MANAGEMENT PLAN
To the Oakland County Board of Commissioners
Mr. Chairperson, Ladies and Gentlemen:

WHEREAS Act 641 of the Public Acts of 1978, as amended, requires the preparation and update every five years of county solid waste management plans; and

WHEREAS this Board, pursuant to the adoption of Miscellaneous Resolution #87244 on October 8, 1987, filed a Notice of Intent to prepare such a plan update with the Director of the Michigan Department of Natural Resources (MDNR); and

WHEREAS said resolution also selected the County Executive to act as the designated planning agency responsible for the preparation of the plan update; and

WHEREAS this Board has appointed a fourteen (14) person Solid Waste Planning Committee (SWPC) to act in an advisory capacity during the preparation of the proposed plan update; and

WHEREAS after thirty (30) public meetings and a public hearing held by the County Executive as the designated planning agency on March 1, 1990, the SWPC has approved the proposed plan update and in accordance with Act 641, has forwarded it to this Board for approval; and

WHEREAS as a result of the review of the public comment record and matters presented to this Board, this Board has certain objections to the proposed plan update which are required to be sent to the SWPC for its recommendations in accordance with Act 641.

NOW THEREFORE BE IT RESOLVED, that the Oakland County Board of Commissioners has the following objections to the proposed Plan update as approved by the SWPC on May 10, 1990:

1) BFI/Marlowe: landfill site shall be removed from the Plan.

2) Host Community fees should be conceptually discussed in the Plan outlining consideration which would form the basis for such fees.

3) A property value protection program should be conceptually discussed in the Plan, along with criteria for specific usage.

4) Section 8.5.4 should be amended to provide that the County Executive will appoint representatives from affected and adjacent communities "with the consent of the Board of Commissioners".

5) Section 8.8.1 should be amended to delete reference to "...for bonds issued to finance the facilities, the County shall pledge its full faith and credit." and insert in place thereof, "The System will be self supporting through revenues generated by waste delivered to the various system components to pay bondholders for any bonds issued to finance the facilities."

6) The proposed SOCRRA landfill expansion should be removed from the Plan

7) The interim siting criteria in Chapter 8.5 should be reexamined to be more specific.

8) Chapter 8.5.12 should be strengthened to provide for affirmative action by the Board of Commissioners.

9) Chapters 8.5.11 and 8.5.12 should be strengthened to provide "...clear and convincing evidence beyond a reasonable doubt..."

BE IT FURTHER RESOLVED that the SWPC is hereby requested to make its final recommendations directly to this Board by June 30, 1990, regarding these objections, as provided in Act 641.

Mr. Chairperson, I move adoption of the foregoing resolution.

Larry P. Crake, Commissioner Dist. #5

Moved by Pappageorge supported by McConnell the resolution be adopted (with the proposed amendments being referred to the Solid Waste Committee for consideration).

AYES: R. Kuhn, McConnell, Moffitt, Pappageorge, Rewold, Skarritt, Wolf, Bishop, Caddell, Calandro, Crake, Gosling, Huntoon, Johnson. (14)

NAYS: Luxon, McCulloch, McPherson, Oaks, Olsen, Pernick, Price, Chester, Jensen. (9)

A sufficient majority having voted therefor, the resolution was adopted.

EXCERPTS FROM THE MINTUES
OF THE
SOLID WASTE PLANNING COMMITTEE
MEETING OF JUNE 14, 1990

MOTION TO APPROVE STAFF RECOMMENDATION ON HOST COMMUNITY FEES

It was moved by JoAnn Van Tassel, supported by Ted Starbuck to approve the staff recommendation on Host Community Fees to include the statement below within the final wording of section 8.5.10.

> As compensation for the various impacts associated or perceived to be associated with a solid waste facility, this plan endorses the concept of payment, by the facility owner, to the community in which the facility is located, of a "host community fee."
>
> The two parties involved (the facility owner and the community within which the facility is located) shall have the responsibility of negotiating a mutually acceptable host community fee.
>
> For new or expanded facilities, the existence of a mutually agreed-upon host community fee, or the lack thereof, may be taken into account in the evaluation, recommendation, and decision to include or deny inclusion of the proposed facility in this Plan.

It was moved by Amber, seconded by Tom Waffen to amend Host Community Fee motion by changing word "endorses" in first paragraph to "acknowledges" and adding words "if any" to end of second paragraph.

Roll Call Vote on Amendment to Motion:

Yeas: Jerome Amber, Ron Baker, Nick Madias, Lerry Pernick, Thomas Waffen

Nays: Jim Meenahan, John King, Lenora Jadun, Mary Shaw Moore, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel

Motion to amend failed.

ROLL CALL VOTE ON ORIGINAL HOST COMMUNITY FEE MOTION:

Yeas: Jim Meenahan, Ron Baker, John King, Lenora Jadun, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: Jerome Amber, Nick Madias

Motion passed.

MOTION TO APPROVE STAFF RECOMMENDATION ON VALUE ASSURANCE PROGRAM

It was moved by Larry Pernick, supported by JoAnn Van Tassel to approve the Staff recommendation on Value Assurance Program, striking word "should", as follows:

> The SWPC supports the concept of a value assurance program for new or expanded facilities and believes that specific application details and economic evaluations should be conducted as a separate implementation policy by the County.

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, John King, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: Lenora Jadun

Motion passed.

MOTION TO APPROVE RECOMMENDATION OF STAFF ON CRC REPRESENTATION BY LOCAL AGENCIES

It was moved by Larry Pernick, supported by JoAnn Van Tassel, to approve staff recommendation on CRC representation by local agencies, as follows:

> Section 8.5.4 be amended to include the provision that when the County Executive appoints representatives from the affected and adjacent community(ies) that the appointment be done only "with the consent of the Board of Commissioners."
>
> Section 8.5.6 wording be changed to "...the notice of a public hearing will not be issued for at least 60 calendar days after receipt of the preliminary environmental assessment..."
>
> Figure 8.5.1 be adjusted to accurately reflect the final interim siting process.

DISCUSSION: Roger Smith explained the wording changes.

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: None

Motion passed.

MOTION TO APPROVE STAFF RECOMMENDATION ON SYSTEM FINANCING

It was moved by Larry Pernick, supported by JoAnn Van Tassel, to approve staff recommendation regarding system financing, as follows:

> Section 8.8.1 should be amended to delete reference to "...for bonds issued to finance the facilities, the County shall pledge its full faith and credit." and insert in place thereof, "The System will be self supporting through revenues generated by waste delivered to the various system components to pay bondholders for any bonds issued to finance the facilities."

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: Nick Madias

Motion passed.

MOTION TO APPROVE STAFF RECOMMENDATION ON INTERIM SITING CRITERIA IN CHAPTER 8.5

It was moved by Larry Pernick, supported by Ted Starbuck, to approve staff recommendation (with addition of "written" before word "evidence") to add the following language to 8.5.10, new language underlined.

> Identify any airports within 10,000 feet of the site. <u>For landfill siting proposals, written evidence of contact with the Michigan Aeronautics Commission must be provided, regardless of the site proximity to the airport(s).</u>

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: None

Motion passed.

MOTION TO APPROVE STAFF RECOMMENDATION ON BOARD REQUEST TO STRENGTHEN WORDING IN SECTION 8.5.12

It was moved by John King, supported by JoAnn Van Tassel, to approve staff recommendation concurring with Plan change requested by Board of Commissioners on Section 8.5.12, as follows:

> This section of the Plan provides for final approval or denial of a siting request by the Board of Commissioners. The Board requested that approval or denial action be by affirmative action of the Board. This is interpreted to mean that any such approval or denial request cannot be allowed to be tabled or killed in Committee, requiring action by the full Board of Commissioners. Language to be adjusted accordingly.

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Larry Pernick, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: None

Motion passed.

MOTION TO APPROVE STAFF RECOMMENDATION ON SECTION 8.5.11 AND 8.5.12

It was moved by JoAnn Van Tassel, supported by Ted Starbuck, to approve staff recommendation to delete language added by Board of Commissioners and use original language, as follows:

> These sections of the interim siting process provide for approval or denial by the County Executive of a positive siting recommendation by the CRC and for approval or denial by the Board of Commissioners of a positive siting recommendation by the County Executive. The Board recommended that in both cases, a denial of the received positive siting recommendation could be made "...only if there is clear and convincing evidence beyond a reasonable doubt that a proposed site does not meet the goals and objectives of the Plan." (Underlined words recommended by the Board.)

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Mary Shaw Moore, Bob Seccombe, Ted Starbuck, David Stinson, JoAnn Van Tassel, Thomas Waffen

Nays: None

Motion passed with Pernick absent during vote.

MOTION TO APPROVE STAFF RECOMMENDATION ON REMOVING SOCRRA LANDFILL FROM PLAN

It was moved by Ted Starbuck, supported by John King, to approve staff recommendation to retain SOCRRA expansion in Update Plan with limitation that SOCRRA landfill is to be solely used as a covered ash monofill.

DISCUSSION: Roger Smith explained that the Board of Commissioners felt that there was too much privately owned landfill capacity designated in the Plan. The Board voted to remove the BFI/Marlowe Landfill and the SOCRRA Landfill expansion from the Plan. Staff recommends that BFI/Marlowe be deleted and that SOCRRA expansion be retained. Jo Ann VanTassel stated that the SOCRRA expansion would be retained provided that it is a covered ash monofill. Ted Starbuck stayed with his motion. Mary Shaw Moore stated she had not seen any geological studies on this site. Tom Waffen indicated that these studies were made available to the SWPC members on two previous occasions and they would also be made available to her.

Roll Call Vote:

Yeas: Jim Meenahan, Jerome Amber, Ron Baker, Lenora Jadun, Nick Madias, Larry Pernick, Ted Starbuck, David Stinson, Thomas Waffen

Nays: Mary Shaw Moore, Bob Seccombe, JoAnn Van Tassel

Motion passed with John King absent during vote.

MOTION TO APPROVE STAFF RECOMMENDATION TO REMOVE BFI/MARLOWE LANDFILL SITE FROM THE PLAN

It was moved by JoAnn Van Tassel, seconded by David Stinson, to approve staff recommendation and concur with Board of Commissioners' position to remove BFI/Marlowe landfill site from the Update Plan.

Roll Call Vote

Yeas: Jim Meenahan, Mary Shaw Moore, Larry Pernick, Ted Starbuck, David Stinson, JoAnn Van Tassel

Nays: Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Bob Seccombe, Thomas Waffen

Motion failed.

MOTION TO RETAIN BFI/MARLOWE SITE IN UPDATE PLAN

It was moved by Jerome Amber, supported by Lenora Jadun, that the BFI/Marlowe landfill site be retained in the Update Plan.

DISCUSSION: Terry Donnelly indicated that we needed a motion to retain BFI/Marlowe in the Plan as the previous motion only acted on the Board of Commissioners recommendation.

Roll Call Vote:

Yeas: Jerome Amber, Ron Baker, John King, Lenora Jadun, Nick Madias, Bob Seccombe, Thomas Waffen

Nays: Jim Meenahan, Mary Shaw Moore, Larry Pernick, Ted Starbuck, David Stinson, JoAnn Van Tassel

Motion passed.

EXCERPTS FROM
OAKLAND COUNTY
BOARD OF COMMISSIONERS
MEETING OF
JUNE 28, 1990

Misc. 90141
By Larry P. Crake
IN RE: UPDATE OF OAKLAND COUNTY SOLID WASTE MANAGEMENT PLAN
To the Oakland County Board of Commissioners
Mr. Chairperson, Ladies and Gentlemen:

WHEREAS this Board has reviewed the proposed update to the Oakland County Solid Waste Management Plan (the "Plan Update") as prepared by the County Executive and approved by the Oakland County Solid Waste Planning Committee ("SWPC") on May 10, 1990, all in accordance with Act 641 of the Public Acts of 1978, as amended ("Act 641"); and

WHEREAS this Board, by resolution adopted on May 31, 1990, noted nine objections to the proposed Plan Update and returned the Plan Update to the SWPC with a request that the SWPC make its final recommendations to this Board by June 30, 1990 regarding the objections, as provided in Act 641; and

WHEREAS the SWPC met on June 14, 1990 to consider this Board's objections to the Plan Update and has submitted its written recommendations to this Board pursuant to a letter dated June 19, 1990 from the chairman of the SWPC; and

WHEREAS this Board has considered the recommendations of the SWPC and deems it is necessary and advisable to approve the Plan Update with certain changes as hereinafter described.

NOW THEREFORE BE IT RESOLVED that the Oakland County Board of Commissioners hereby approves the Plan Update as issued on May 10, 1990 by the Solid Waste Planning Committee with the following changes:

1. The BFL/Rose Township landfill designation will be removed from the Plan Update.
2. Section 8.5.10 will be amended to include the following host community fee language.

   As compensation for the various impacts associated or perceived to be associated with a solid waste facility, this plan endorses the concept of payment, by the facility owner, to the community in which the facility is located, of a "host community fee."

   The two parties involved (the facility owner and the community within which the facility is located) shall have the responsibility of negotiating a mutually acceptable host community fee.

   For new or expanded facilities, the existence of a mutually agreed-upon host community fee, or the lack thereof, may be taken into account in the evaluation, recommendation, and decision to include or deny inclusion of the proposed facility in this Plan.
3. Sections 8.5.4 and 8.5.6 (CRC representation by local agencies) will be amended to include the following language.

   The last sentence of the second paragraph of Section 8.5.4 will be amended by adding at the end thereof "with the consent of the Board of Commissioners."

   The third sentence of the first paragraph of Section 8.5.6 will be amended by deleting "will be issued 60 calendar days" and substituting therefor "will not be issued for at least 60 calendar days."

   Figure 8.5-1 will be adjusted to accurately reflect the final interim siting process as attached.
4. Section 8.8.1 (System Financing) will be amended as follows.

   Section 8.8.1 will be amended by deleting the second sentence of the first paragraph thereof and inserting in place thereof, "The System will be self supporting through revenues generated by waste delivered to the various system components to pay bondholders for any bonds issued to finance the facilities."
5. Part 2 of Section 8.5.10 (Interim Siting Criteria) will be amended as follows (new language underlined).

   Identify any airports within 10,000 feet of the site. <u>For landfill siting proposals, written evidence of contact with the Michigan Aeronautics Commission must be provided, regardless of the site proximity to the airport(s).</u>
6. The last sentence of Section 8.5.12 (Board of Commissioners Approval Process) will be amended as follows (new language underlined).

   The Board will give due regard to the CRC and County Executive recommendations in evaluating the proposal, <u>will approve or deny the recommendations only by affirmative action of the Board</u> and will reject a recommendation only if there is clear and convincing evidence that a proposed site does not meet the goals and objectives of the Plan.

7. Limiting language will be added to the designation of the SOCRRA landfill expansion as follows.

This expansion is included only as a covered ash monofill for waste-to-energy residue.

BE IT FURTHER RESOLVED that the Plan Update with the changes noted above, shall be submitted first to Oakland County's 61 municipalities for their approval and after receiving 67% affirmative responses (41 minimum), the Plan Update shall be submitted to the Michigan Department of Natural Resources for its final approval.

Mr. Chairperson, I move the adoption of the foregoing resolution.

Larry P. Crake, Commissioner, District #5

Moved by Crake supported by Caddell the resolution be adopted.

Moved by Chester supported by Aaron the SOCCRA Incinerator be removed from the 641 Plan.

Discussion followed.

AYES: Chester, Gosling, Johnson, R. Kuhn, Law, Luxon, McConnell, McPherson, Moffitt, Price, Bishop. (11)
NAYS: Caddell, Calandro, Crake, Huntoon, Jensen, S. Kuhn, McCulloch, Oaks, Olsen, Pappageorge, Pernick, Rewold, Skarritt, Aaron. (14)
ABSTAIN: Wolf. (1)

A sufficient majority not having voted therefor, the amendment failed.

Moved by Chester supported by McPherson to remove and delete the proposed new SOCCRA Incinerator from the 641 Plan without prejudice, for SOCRRA's right to apply for inclusion in the Incinerator Plan once it has air permit from the state, and has met other requirements opposed by the County Plan.

The Chairperson ruled the amendment out of order.

Mr. Chester appealed the decision of the Chair.

The Chairperson stated a "yes" vote would sustain the Chair.

AYES: Calandro, Crake, Gosling, Huntoon, Jensen, Johnson, R. Kuhn, S. Kuhn, Law, Luxon, McConnell, McCulloch, Moffitt, Oaks, Olsen, Pappageorge, Pernick, Price, Rewold, Skarritt, Aaron, Caddell. (22)
NAYS: Chester, McPherson, Bishop. (3)
ABSTAIN: Wolf. (1)

A sufficient majority having voted therefor, the decision of the Chair was sustained.

Moved by Chester supported by McPherson the County Plan be amended to provide that any new or existing waste-to-energy facility must have a minimum 1000 foot set-back from any resident, school, park or similar structural facility.

AYES: Chester, Gosling, Johnson, Luxon, McPherson, Moffitt, Price, Bishop. (8)
NAYS: Crake, Huntoon, Jensen, R. Kuhn, S. Kuhn, Law, McConnell, McCulloch, Oaks, Olsen, Pappageorge, Pernick, Rewold, Skarritt, Aaron, Caddell, Calandro. (17)
ABSTAIN: Wolf. (1)

A sufficient majority not having voted therefor, the amendment failed.

Moved by Bishop supported by Price to amend the resolution on page 3, item #7, by striking the SOCCRA Lanfill from the 641 Plan.

AYES: Gosling, Johnson, R. Kuhn, Law, McPherson, Moffitt, Price, Rewold, Bishop, Chester. (10)
NAYS: Crake, Huntoon, Jensen, S. Kuhn, Luxon, McConnell, McCulloch, Oaks, Olsen, Pappageorge, Pernick, Skarritt, Aaron, Caddell, Calandro. (15)

A sufficient majority not having voted therefor, the amendment failed.

Moved by Johnson supported by Skarritt that section 8.5.10 be amended in the 1st paragraph, 5th sentence by adding the words "or contiguous County" following the words "within the County."

A sufficient majority having voted therefor, the amendment carried.

Vote on the 641 Solid Waste Management Plan, as amended:
AYES: Huntoon, Jensen, Johnson, R. Kuhn, S. Kuhn, Law, Luxon, McConnell, Oaks, Olsen, Pappageorge, Pernick, Price, Rewold, Skarritt, Wolf, Aaron, Caddell, Calandro, Crake. (20)
NAYS: Gosling, McCulloch, McPherson, Moffitt, Bishop, Chester. (6)

A sufficient majority having voted therefor, the resolution, as amended, was adopted.