MINNESOTA POLLUTION CONTROL AGENCY

STATE SOLID WASTE POLICY REPORT

A FOCUS ON GREATER MINNESOTA

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A Focus on Greater Minnesota

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These background papers have been bound separately. To obtain a copy, contact:

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CHAPTER I: EXECUTIVE SUMMARY

Statutory Authority

The 1987 legislative session resulted in amendments to the Waste Management Act which directed the Minnesota Pollution Control Agency (MPCA or agency) and the Minnesota Waste Management Board (WMB) to jointly prepare and adopt a Solid Waste Policy Report for the 80 counties outside of the seven county Twin Cities Metropolitan Area. (These 80 counties are referred to as Greater Minnesota in this report.) The report was to be adopted by the citizen boards of both agencies by November 15, 1988 and jointly submitted to the Legislative Commission on Waste Management. The report is to be revised every two years.

In terms of the specific content of the report, the Legislature directed the two agencies to look at the following:

1. a summary of the current status of solid waste management, including the amount of waste generated, the manner in which it is collected, processed, and disposed, the extent of separation, recycling, reuse, and recovery, and the facilities available or under development to manage the waste;
2. a summary of the current state solid waste management policies, goals, and objectives, including their statutory, administrative, and regulatory basis and the state agencies and political subdivisions responsible for implementation;
3. an evaluation of the extent and effectiveness of implementation and an assessment of progress in accomplishing state policies, goals, and objectives;
4. estimates of the generation of solid waste anticipated for the future, the manner in which the waste is likely to be managed, and the programs and facilities that will be available and needed for proper management;
5. identification of issues requiring further research, study, and action, the appropriate scope of the research, study, or action, the state agency or political subdivision that should implement the research, study, or action, and a schedule for completion of the activity; and
6. recommendations for establishing or modifying state solid waste management policies, authorities, and programs. (Minn. Stat.§115A.411, Subd. 2. (supp.1987))

As noted above, the legislature specifically excluded the Metropolitan Area from being a focus of this report. (Minn. Stat.§ 115A.411, Subd.1. (supp.1987)). The Metropolitan Council has responsibility for solid waste planning in the Metropolitan Area, and prepared and adopted a Solid Waste Management Plan for that area in 1985. This policy plan is currently being revised. The Council also reports annually to the legislature on abatement programs and the status of landfill capacity. These reports will be presented to the Legislative Commission on Waste Management in late 1988.

The Metropolitan Council was asked to contribute planning information in order to complete the statewide technical content of the report and to reflect the nature of solid waste planning underway in the Metropolitan Area. However, the reader should note that the findings and recommendations contained in this document have not been formally reviewed by the Council and do not necessarily reflect the policy of the Council.

On October 7, 1988 the Governor, by Executive Order, abolished the nine member citizen Waste Management Board and transferred the Board's powers and duties to the Pollution Control Agency and the Environmental Quality Board (EQB). The EQB assumed the hazardous waste siting functions, with all other functions being assumed by the MPCA. The powers and duties transferred to the MPCA are now the responsibility of two new MPCA Offices, the Office of Waste Management Grants and Assistance and the Office of Waste Tire Management. The State Solid Waste Policy Report was approved by the MPCA board. To reflect the change resulting from the Governor's Order, the report will continue to refer to the Waste Management Board when speaking of actions or responsibilities prior to the merger.

Process for Development of the Policy Report

To facilitate the preparation and development of the policy report a WMB/MPCA Joint Board Committee (JBC) was formed, composed of three members from the Waste Management Board, three members from the Pollution Control Agency Board, and one ex-officio member from the Metropolitan Council. (A list of JBC members is included in Appendix A.) The JBC held seven public forums throughout the state to gather input and ideas, and to identify issues of concern from those working on solid waste management in Greater Minnesota and the Twin Cities. Forums were held in Rochester, St. Paul, Alexandria, Marshall, Grand Rapids, Thief River Falls, and Fosston. The forums were held between November 1987 and April 1988. Attendance ranged from 25 to 75 people. Summaries of the comments received at the forums are available, and are contained in Chapter I of the report's background papers. The forums were publicized regionally by sending press releases to the weekly and daily newspapers, radio stations, and television stations, and by follow up telephone

calls to the major media in the region. In addition, the two agencies did regional mailings notifying county solid waste officers, municipal and county officials, other state agencies, solid waste management businesses, and environmental and citizen organizations of the meetings.

In addition to holding regional forums, members of the JBC also toured solid waste management facilities around the state, including waste-to-energy facilities in Rochester, Alexandria, and Fosston, the densified Refuse Derived Fuel facility in Thief River Falls, and recycling facilities in Alexandria, Grand Rapids, and Rochester. A scheduled tour of a landfill had to be cancelled.

A Solid Waste Policy Report Task Force was formed to advise the JBC on the draft report and to discuss and recommend policy issues for inclusion in the report. The 15 member Task Force was composed of representatives from local government, county solid waste officers, solid waste industries, and citizen and public policy organizations working in the area of solid waste management. (A list of Task Force members is included in Appendix A.) The Task Force met monthly from November 1987 to April 1988, and October 1988 to review and comment on the report and recommendations.

Format of the Report

The report has fourteen chapters with background papers for each chapter providing additional detail and documentation for the recommendations contained in the report. The chapters and supporting background papers are as follows: I. Executive Summary, (the background paper for Chapter I is a documentation of public input into the development of the policy report) II. Policy Overview, III. Current Roles and Programs, IV. County Planning, V. Amount of Waste Generated, VI. Collection and Transportation, VII. System Costs, VIII. Industrial and Special Waste Streams, IX. Waste Education, X. Waste Reduction, XI. Recycling, XII. Composting, XIII. Waste to Energy, and XIV. Land Disposal. The report and background papers total approximately 700 pages. Individual background papers have been separately bound, and are available on request. Below is a section containing major findings and recommendations. In order to implement the agency recommendations, additional funding may be necessary.

Major Findings and Recommendations

A. Recycling, Waste Reduction, and Yard Waste Composting are Preferred Waste Management Methods and Need Increased Funding.

There is virtually unanimous agreement that waste reduction, recycling and yard waste composting are environmentally preferred technologies for managing significant portions of the waste stream. In many cases, these may also be the least costly method. Although a good deal of activity has started in these technologies, there is also widespread agreement that much more can be and should be done at all levels of government to increase the utilization of reduction, recycling, and yard waste composting. Any statement of a waste management hierarchy should exhibit a clear preference for these approaches, and more should be done to implement them.

Waste reduction is widely recognized as a preferred waste management method. However, considerable debate and discussion exist about the definition of waste reduction. No definition currently exists in statute, and working definitions in use at the state and federal level differ in terms of content and focus. A definition of waste reduction will need to include among other things: a clear distinction between reduction, recycling, and volume reduction after the point of generation.

Waste reduction programs in Minnesota include a mandated state government resource recovery program, a requirement that all counties address waste reduction in their county plans, a grant program to encourage waste reduction and separation projects, technical assistance to units of government regarding procurement policies to stimulate waste reduction and recycling, technical and research assistance and grants to generators of hazardous and nonhazardous industrial waste (MnTAP), and a ban on yard waste in disposal facilities.

At the local level counties' waste reduction efforts center primarily on waste education. In addition, the results of a 1988 survey (sent to 80 Greater Minnesota county solid waste officers to gather data for the policy report) show that of the 45 responding counties at least six have office paper reduction, seven purchase in bulk, four have volume-based fees existing in the county, and four purchase products with extended warranties. In the Metropolitan Area, there have been major educational campaigns to encourage the leaving of grass clippings on lawns. No attempt was made to survey waste reduction activities by the non-governmental sector. However, some waste reduction activities can be cited, although the extent of such actions is limited. Examples include: grocery stores and food co-ops that provide waste reduction opportunities such as selling goods in bulk, use of returnables, and reuse of grocery bags; corporations that

implement office paper reduction or industrial waste reduction; non-profit groups, such as Goodwill, that facilitate the reuse of products; and waste exchanges that facilitate the utilization of waste products between firms.

One reason waste reduction practices are not more widespread is the difficulty in measuring the success of waste reduction programs. Other reasons include cultural biases which favor convenience and newness over conservation and a general predisposition in environmental solutions to go to the "end of the pipe" and deal with something after it has been generated; inertia, both institutional and individual, are also contributing factors.

In general, implementation of waste reduction activities at the state and local level appears to be at the early stages of development, and more needs to be done to improve performance in this area.

With respect to recycling, no comprehensive data exist on the extent of recycling opportunities or the actual amounts of waste being recycled in Greater Minnesota. In June 1988, 29 counties were identified as having multi-material recycling centers available. Approximately 50 do not have multi-material recycling centers available, and 13 counties were identified as having no known recycling centers. Information on the extent of curbside programs is even more limited. However, a recent review of news clippings and other sources indicates that there is growth in the number of such programs. (Appendix C of this report summarizes these programs county by county.) In terms of actual quantities of materials being recycled in Greater Minnesota, a 1988 survey of county plans and solid waste officers indicated that approximately 44,000 tons of waste were being recycled in 1987. This constitutes about 4 per cent of the total waste stream. Recycling opportunities are available for a large portion of Metropolitan Area residents either through curbside programs, drop-off, or buy back centers.

While no attempt has been made in this report to comprehensively assess the role of the private sector in recycling activities in Minnesota, it should be noted that private sector activities and investments have played a large role in achieving current recycling levels. State actions to encourage recycling around the state need to be carefully designed so as not to disrupt current and growing private sector activity. At the same time, private sector actors will need to provide complete, accurate, and verifiable data which are critical for the development of effective recycling policies and programs.

There are a number of factors which have led to the relatively small amount of recycling which is currently taking place in Greater Minnesota. Among them are the following: definition and

measurement problems have caused a good deal of confusion and disagreement; low and or unstable prices, and the location of major markets in the Metropolitan Area puts recycling efforts in Greater Minnesota at a cost disadvantage; the notion that recycling activities should be "profitable" rather than viewed as a public service such as ordinary garbage collection which may incur net costs; the difficulty in accurately estimating the per ton cost in light of significant unknowns regarding participation rates and prices to be received for recycled goods; and the fact that recycling requires direct and significant behavioral change by the individual. This last factor means that recycling requires a firm commitment to education and community organization skills and activities not required for more centralized waste management activities.

A review of past state actions indicates that while there has been consistent policy support for recycling, there has been a somewhat less consistent and aggressive action program to foster statewide recycling. At the statewide public forums held to solicit input for this report county officials, private recyclers, and members of public interest and environmental groups repeatedly stated the need for greater state funding for program development and educational campaigns. (A further discussion of these issues can be found in Chapters X and XI, in Appendices B and C of this report, and in the background papers for these chapters.)

Recommendations:

1. The state should fund increased technical assistance and informational materials to focus on the opportunities for reduction by public and private sectors. In addition, the state should fund programs or award systems to encourage innovative and demonstration waste reduction programs by local governments or private industry, as well as incentives to ensure that distributors and retailers provide consumers with access to waste reduction opportunities.

2. The state should require state agencies and other public entities that receive state money to implement recycling programs and procurement policies that give preference to products containing recycled materials and compost products unless not applicable due to health impacts.

3. The state should substantially increase the funding for the Low-Tech grant program for reduction and separation projects. Increased funding would reflect the state's priorities and commitment to recycling and reduction.

4. The state should consider expanding financial assistance programs to include private owners and operators to encourage the development of recycling in Greater Minnesota.

5. The state should establish a statewide permanent funding mechanism to provide support for recycling activities throughout the state.

6. The state should provide funding to expand the existing recycling programs within state government and establish specific goals and targets.

7. The state should develop goals for recycling, including methods and timetables for requiring implementation of the goals. The new mandates should be made in the context of the county planning program.

8. The state should closely monitor performance in meeting recycling goals and state financed incentives should be developed based on performance in meeting these goals.

9. The state should consider and further study mandatory approaches to recycling as a way of improving statewide performance.

10. The state should develop a uniform and consistent definition of "waste reduction." The definition should emphasize the reduction of waste at the source of generation and should make clear the difference between reduction and recycling.

11. The agency should develop a list of currently practical "opportunities to reduce" and efforts should be made to extend those opportunities to all Minnesotans.

12. The agency should explore the development of methods to measure the results of waste reduction efforts.

13. The agency should explore mechanisms to transfer the avoided cost savings (i.e., the money saved by recycling instead of burning or landfilling) to public and private recycling programs.

B. The State Needs to Improve Its Ability to Make Environmental and Health Risk Comparisons Between MSW Composting, Waste-to Energy, and Land Disposal and Needs to Maintain a Flexible Waste Management Hierarchy Which is Responsive to Local Conditions.

Since the early 1980s, there has been an increase in the level of understanding among regulators and others regarding the health risks and uncertainties associated with waste-to-energy technologies. The data that feed this new understanding come from an increased ability to detect pollutants and assess their impact on human health and the environment. Contaminant dispersion and subsequent accumulation in the environmental media, including the food chain, have caused individuals who assess risk to become concerned. Because the actual risk from facilities is not

completely understood, many of the decisions made at each point in a health risk assessment include some amount of uncertainty. As a result, the MPCA responds to conflicting or inadequate data by choosing the most environmentally conservative value for which there is scientific validity.

At the same time, new regulations have been developed which have increased the requirements and standards for landfilling to reduce health and environmental risks posed by land disposal. Research into the risks associated with MSW composting (both in terms of workplace risks and risks associated with compost usage) is still at a very early stage.

There is a lack of adequate knowledge regarding the comparative health risks of MSW composting, waste-to-energy, and land disposal. The depth of health risk analysis that has been conducted on waste-to-energy facilities has not been duplicated with other technologies. Further, we lack adequate knowledge as to what specific actions to take to reduce the hazard posed by these technologies in terms of waste stream controls and siting requirements. Research needs to be accelerated in order to establish clearer direction for technology choices.

In addition, there is a feeling that the state has done more to further the development of waste-to-energy technologies (e.g., the designation of waste to these facilities and the availability of grants and loans for capital costs) than other management methods such as recycling and waste reduction. This opinion was expressed by some members of the Solid Waste Policy Report Task Force, and was frequently expressed at the statewide public forums held to solicit input and to identify areas of concern for the policy report.

Given these factors, there is a concern that the state not be perceived as having a rigid hierarchy which places land disposal as the alternative of last resort at all times under all conditions. The state should maintain a flexible hierarchy which leads to choices based on environmental protection appropriate to local conditions. (A further discussion of these issues can be found in Chapters XII, XIII, and XIV and in the background papers for these chapters.)

Recommendations:

14. The state should provide the agency with the funding necessary to develop a method to determine the health risks associated with various technologies and a method to compare risks in order to make better judgments on the priority of management options in a comprehensive solid waste management system, and to aid local governments in choosing the most environmentally sound management system given local conditions.

15. The state should clarify state policy with respect to the appropriate role of each component of an integrated waste management system in order to encourage the development of systems based on the composition of the waste, and on the most environmentally sound method of managing the waste (e.g., remove recyclable items from the waste stream, compost the organics, do not burn metals and glass). Thus waste stream constituents would be matched to the management practice best suited to those particular constituents.

16. The state should expand the mandatory training and certification programs for disposal facility operators and inspectors to include incinerators and MSW compost facilities, and should fund these programs.

17. The state should define "composting" in statute to ensure that a single consistent definition is used in all programs and contexts. In addition, the state should develop a uniform definition of the term "degradable," as in "degradable plastics."

18. The state should reassess the proportion of financial incentives available for waste-to-energy projects versus other management components of an integrated management system.

19. The state should continue to require state-of-the-art air pollution control equipment for all waste-to-energy facilities, including the repermitting of existing facilities.

20. The agency should assist counties in identifying existing and potential regional service areas to encourage development and management of an integrated waste management system.

21. The agency should study the designation process to determine if local governments are provided with sufficient authority to control waste streams in order to implement an integrated waste management system. Specifically, the study should determine whether or not the designation process should be expanded to include land disposal, mixed municipal solid waste (MSW) compost, and recycling facilities.

22. The agency should explore and develop appropriate programs and guidelines for the following areas of concern: 1) compost facility worker exposure; 2) end use guidelines for compost; 3) alternative management for incinerator ash.

C. Increased State Activity is Needed in the Area of Waste Education.

Waste Education is widely recognized as a key element in a long term strategy for improving waste management in the state. Waste education is also recognized as an area where the state has a

very important and appropriate role to play in directing, coordinating, preparing, and making materials available.

The Waste Education Coalition is an effort to coordinate existing waste education efforts and to improve performance in this area. The Coalition has three committees: a clearinghouse committee, a youth education committee, and a community information and education committee. The Coalition is currently involved in the following activities: establishing a computerized waste information clearinghouse and referral system; contracting with a consultant to modify and expand the Itasca County solid waste management education campaign; issuing a Request for Proposal to develop a curriculum framework for grades K-6 and complete one instructional unit; and sponsoring a statewide advertising campaign focusing on recycling. Informational materials are being collected and distributed through the clearinghouse.

A recent survey by the Coalition indicates that Minnesota teachers are interested in teaching waste issues, but feel limited in terms of resources available and the time constraints of required curricula. The Coalition is trying to remedy this situation by developing a model waste education curriculum. A key element in waste education in the schools is the "living example" in which students learn about waste management by actually participating in separation, reduction, and recycling. (A further discussion of this issue is found in Chapter IX and in the background paper for the chapter.)

Recommendations:

23. The state should provide funding for the development, production, and evaluation of school curricula and programs related to waste management issues, including funding for technical assistance to assist school administrators in developing "living example" waste reduction and recycling programs.

24. The state should provide funding for technical assistance for the development of community education programs, including materials and training workshops relating to solid waste management.

25. The state should provide additional funding for the placement of waste education ideas and materials in the mass media (e.g. newspaper advertisements, billboards, public service announcements for radio, brochures).

26. The state should require that all state funded waste management initiatives have a waste education component.

D. Lack of Accurate and Adequate Data Limits Policy Analysis and Development.

Accurate data is critical to making informed judgments and evaluations regarding the effectiveness of waste management programs, the magnitude of waste management problems, and for anticipating emerging problems and proposing workable solutions. Current data is significantly lacking in the areas of amounts and types of waste generated in Minnesota, in the various ways in which waste is managed (e.g. recycled, land disposed), in the composition of waste, in the costs of waste management, in the remaining capacity at currently permitted landfills, in the performance of state funded landfill abatement projects and in the implementation progress of county solid waste management plans. A systematic approach to data gathering and reporting is often lacking. When data is available, it can come from a variety of sources using different units of measurement, thus making comparisons difficult. (A further discussion of these issues can be found in Chapters IV, V, VI, VII, X, XI, and XIV and in the background papers for these chapters.)

Recommendations:

27. The state should fund a number of waste generation studies and composition studies around the state to develop new baseline data considering regional and seasonal differences.

28. The state should fund a computerized data base network to encourage communication and information sharing among state agencies and local governmental units, and to standardize data gathering and to allow for more uniform reporting.

29. The agency should develop a uniform reporting system as part of the county planning process in order to provide a comprehensive data base for statewide policy development and analysis, and to allow counties to indicate progress and problems in local solid waste activities. Reports should coincide with the state policy report schedule and would provide a major source of data for the report. The reports should include information on the amount of waste generated, recycled, and managed by various technologies, including land disposal capacity, as well as the current cost of solid waste management activities. Technical assistance should be made available to the counties in order to facilitate their participation.

30. The agency should improve the reporting and tracking of projects that receive state grant and loan money in order to assist in evaluating the cost effectiveness of a chosen technology.

31. The agency should closely monitor local initiatives, such as organized collection and volume-based pricing, and other

innovative collection methods so that any information gained can be transferred to other interested parties. The agency should continue and expand technical assistance programs to all local governments and interested parties.

32. The agency should monitor implementation of the new solid waste rules to determine if sufficient information about industrial waste generation and management are obtained.

E. Current Solid Waste Management Roles and Programs Are Complex and Need Further Study.

Solid waste management in Minnesota is complex, with many interconnecting and overlapping responsibilities, authorities, powers, and resources. Public sector roles and responsibilities are divided among several state agencies, a variety of local government units (counties, municipalities, joint powers boards, districts), and the Metropolitan Council. In addition, in virtually every aspect of waste management, there is important private sector activity.

Minnesota counties are responsible for the planning and implementation of solid waste management systems, and may be financially liable for some of the costs associated with remedial action at landfill sites. They may undertake these responsibilities individually or, in some instances, through multi-county regional efforts. While counties have the basic responsibility for waste management, the state provides a variety of types of financial and technical assistance and also issues permits and sets standards with which solid waste activities must comply. Other entities which play an important role in solid waste management include municipalities, which in many cases are responsible for collection and transportation of waste and for recycling programs, private haulers and landfill operators, private recyclers, and non-profit businesses and civic organizations involved in recycling. The large number of participants in the implementation of solid waste programs creates a complex and sometimes confusing set of interrelationships.

Another type of complexity occurs in the relationships between activities in the Metropolitan Area and in Greater Minnesota.The Metropolitan Council has the responsibility for solid waste planning and policy development in the Metropolitan Area. The MPCA is responsible for a number of activities statewide (including the Metropolitan Area) such as permitting and enforcement, but is responsible for planning and policy development only in Greater Minnesota.

One of the problems created by overlapping authority is that the same word or activity can be defined and/or measured differently by different entities. For example, waste reduction is not

defined in statute and is defined by the Metropolitan Council's policy plan one way and by the agency's county planning rules another way. Another example is that recycling is measured differently in Greater Minnesota than it is in the Metropolitan Area.

Although the report does not contain a comprehensive analysis of the gaps, overlaps, strengths, and weaknesses of the current distribution of authorities and responsibilities, it does contain a number of recommendations relating to this complex set of interrelationships. (A further discussion of these issues can be found in Chapters II, III, and IV and in the background papers for these chapters.)

Recommendations:

33. The state should further evaluate the existing solid waste system and develop recommendations. Solid waste management responsibilities are currently distributed among various governmental levels, agencies,and the private sector. The roles and responsibilities in the metropolitan and non-metropolitan areas should be investigated. In addition, issues related to the powers of counties and of joint county activities (districting, designation, and joint powers agreements) should be investigated and analyzed to determine whether improvements in the current system are needed or whether impediments exist. Systems used in other states should be studied for comparison.

34. The agency should investigate the need to eliminate discrepancies between the certificate of need (CON) rule in Greater Minnesota and in the Metropolitan Area. In addition, the agency should investigate problems associated with waste flow from the Metropolitan Area to Greater Minnesota.

35. The agency should continue to strengthen key links between all affected parties involved in planning, grants, permitting, and facility development so that an integrated system is developed which matches waste stream constituents to the management practice best suited to them.

F. Current Staffing and Funding Levels Are Inadequate to Meet Regulatory and Program Needs.

Current MPCA solid waste program activities include permit issuance, establishing standards, enforcing permit conditions and standards, emergency and financial response (Superfund), training and certifying operators and inspectors of solid waste facilities, development of household hazardous waste programs and incinerator ash rules.

Additionally, the agency is responsible for issuing grants for landfill abatement projects, a market development program for

recyclables and compost, a waste education program (including coordinating the efforts of the Waste Education Coalition), an industrial wastes program (including MnTAP), a used oil management program, county planning approval and technical assistance, and certificate of need issuance and assistance.

The enforcement of environmental standards and permit conditions is multi-faceted and complex. Enforcement tools include compliance permits, inspections, notices of violation, stipulation agreements, orders (compliance/closure), and litigation. Enforcement activities require careful documentation, making them time intensive. Further, staff time is dedicated to other activities such as special projects (e.g. participating on task forces, organizing conferences); responding to information requests from the public, and from industry, federal, state, local government, legislative representatives, consultants and others; and training.

The cost of conducting closure, post-closure care, and remedial actions at closed and abandoned facilities and short term land disposal sites (i.e., sites that do not have enough capacity or time to raise the money needed for financial assurance) is a major concern. This is compounded by the municipal liability cap for Superfund actions. The liability cap for political subdivisions needs to be clarified and because interpretation of the limit ranges from $300,000 to $1.2 million. A severe shortfall in the revenues needed to conduct these activities will occur.

The extent of staff turnover and the perception of inconsistent enforcement activities were issues raised at some of the statewide public forums held to solicit input on the development of the policy report, and by members of the Solid Waste Policy Report Task Force. (Further discussion of these issues can be found in Chapter III, Current Roles and Programs and in the background paper for that chapter.)

Recommendations:

36. The state should increase MPCA and Attorney General staff complement to allow for timely monitoring, inspection, and administrative steps to attain permit standards and state goals. Mechanisms should be developed to attract and retain qualified professional staff and minimize staff turnover. The state should adequately fund the MPCA to keep track of research so that informed decisions can be made regarding technology choices and policy and program development.

37. The state should resolve questions of municipal liability and find methods to fund the proper closure, postclosure, and remedial action at closed and abandoned land disposal facilities

in order to minimize the risk to public health and the environment from these facilities.

CHAPTER II: OVERVIEW OF POLICY

Introduction

Solid waste management has included everything from the backyard dump to waste-to-energy facilities and has changed over time in response to new information and governmental policies. The development of solid waste policy in Minnesota is complex and spans many years. There is no single policy stated anywhere in statute, but there are many statutes with many policies. However, the overriding goal behind governmental actions is to minimize risk to human health and the environment from solid waste management practices. A Table summarizing state laws, policies, and programs in solid waste is contained in Appendix B.

Policy Development Through 1970

A review of the history of solid waste management is necessary to understand why no single policy exists but rather a number of policies have been included in statute over time. The most common method of solid waste disposal in aggregate has been the open burning dump. In Minnesota, it is estimated that over 1500 open dumps were used with the majority sited in swamps, floodplains, and gravel pits. Few controls were used to minimize the typical problems of smoke, odor, rodents, flies, blowing paper and water pollution. It is estimated that various hazardous wastes, like oils and solvents, found their way into many of the open dumps.

The regulatory control of open dumps was the responsibility of local governments in which the dumps were located. Supplementing the local control were two state units of government; the Minnesota Department of Health, started in 1927, and the Water Pollution Control Commission, started in 1945. The Minnesota Department of Health's control was limited to tourist camps, summer hotels and permits for disposal facilities impacting surface waters. Only one solid waste permit was issued.

In 1967, the Minnesota Pollution Control Agency (MPCA) was established. In 1969, the MPCA adopted an air quality rule banning open burning. Also in 1969, the Minnesota Legislature directed the MPCA to control solid waste disposal practices and to adopt standards, regulations, and variances regarding solid waste. In 1970, the MPCA adopted solid waste rules to address the collection, transportation, and disposal of solid waste. The rules required closure of open dumps and placed operational controls on permitted facilities.

Policy Development in the 1970s

The Minnesota Environmental Rights Act of 1971 authorized citizen suits to protect the air, land and waters of the state. This act reinforced the premise that citizens were afforded the right to a clean environment. In 1973, the legislature again responded to environmental concerns by enacting a series of environmental policies. The Environmental Policy Act generally stated that it was state policy to encourage productive and enjoyable uses of our resources while protecting the environment and understanding the ecological systems. Specific to solid waste, state agencies were to improve and coordinate state plans so as to act as a trustee of the environment, reduce wasteful practices, minimize depletion of natural resources, conserve natural resources and encourage better understanding of the ecological systems and natural resources important to the state and the nation. Environmental Impact Statements were also required. With the passage of the Recycling of Solid Waste Act, the 1973 Minnesota legislature also recognized the need to reduce the amount of waste produced and encourage recycling.

The MPCA revised its solid waste rules in 1973 to strengthen the land disposal facility standards. The rules were based on federal guidelines published in 1972. The changes included a five foot minimum separation to ground water, monitoring requirements and restrictions on the waste permitted for disposal. Closure requirements were also established. Solid waste was a major issue in 1973. Finally, legislative action in 1973 established the Environmental Education Board to promote and coordinate environmental education activities throughout the state.

The later years of the seventies were reasonably quiet regarding solid waste. In 1974, the MPCA adopted rules governing packaging. These rules were challenged in the Supreme Court, which decided the MPCA acted outside of its authority. The rules became guidelines. In 1979, the MPCA adopted hazardous waste rules as well as solid waste rules which incorporated less restrictive standards for land disposal facilities in areas with a population under 2500.

Policy Development in the 1980s

The Waste Management Act of 1980 initiated a decade of intensive solid waste legislation. Every year since 1980, the Waste Management Act has been amended to address some issue of solid waste management and broaden the scope of state policy. The Waste Management Act created the Waste Management Board and the Legislative Commission on Waste Management. The goal of the

Waste Management Act is the improvement of waste management to serve the following purposes:

(a) reduction in waste generated;
(b) separation and recovery of materials and energy from waste;
(c) reduction in indiscriminate dependence on disposal of waste;
(d) coordination of solid waste management among political subdivisions; and
(e) orderly and deliberate development and financial security of waste facilities including disposal facilities. Minn. Stat. § 115A.02 (1987).

Since 1980, the Waste Management Act has been amended in the following manner (program implementation activities as the result of legislation are included):

1. 1981
   * required the agency to establish intrinsic suitability requirements for land disposal of solid waste
   * permitted bond issuance for construction of solid waste management facilities.

2. 1982
   * authorized flow control for resource recovery facilities
   * required WMB to approve designation plans for resource recovery facilities
   * exempted recycled materials from designation
   * the WMB adopted rules for the creation of Solid Waste Management Districts.

3. 1983
   * eliminated WMB grants and loans to facilities that do not recover resources
   * the MPCA grant programs for planning and implementation of low technology waste management options were eliminated under budget cuts.

4. 1984
   * directed the MPCA to certify the need for land disposal capacity before issuing permits
   * incorporated the county planning process as a mandatory part of the permitting process
   * established responsibility of facility owners and operators for closure, postclosure care and contingency action at land disposal facilities
   * required financial assurance for land disposal facilities
   * established the metropolitan landfill surcharge
   * authorized nonmetropolitan counties and cities to
   * assess surcharges at land disposal facilities
   * banned the land disposal of waste tires after July 1, 1985

* the WMB established rules regarding eligibility and application requirements for technical and financial assistance to solid waste processing facilities.

5. 1985
* required the Commissioner of Administration to establish a recycling program for all state agencies and the legislature
* authorized municipalities to exceed levy limits for solid waste
* provided additional capital assistance money
* allowed loans by the WMB for demonstration programs
* banned the disposal of unprocessed mixed municipal solid waste in the Metropolitan Area after January 1, 1990
* the MPCA adopted planning rules and certificate of need rule
* the WMB adopted Solid Waste Processing Capital Assistance Program Rules.

6. 1986
* created a State Potable Water Protection Policy.

7. 1987
* transferred the responsibility for county planning assistance from the MPCA to the WMB
* required the MPCA to establish a program to manage household hazardous waste
* required the WMB to establish programs in market development, waste education, and reduction and separation grants
* required the WMB and MPCA to jointly prepare and adopt a report on solid waste management policy for Greater Minnesota
* banned the disposal of lead acid batteries and used oil in mixed municipal solid waste after January 1, 1988
* the WMB adopted Solid Waste Reduction and Separation Grant Program Rules and Environmental Testing Grant Rules.

8. 1988
* established a solid waste incinerator ash management program
* banned land disposal and incineration of yard waste in the Metropolitan Area after January 1, 1990 and statewide after January 1, 1992
* banned the use of plastic beverage cans and banned the use of nondegradable plastic rings that hold together beverage or motor oil containers
* required the LCWM in cooperation with state agencies to study disposal fees and recommend to the legislature a fee regulation system

* required the development of goals and timetables to reduce the quantity and toxicity of solid waste incinerator ash
* Required the adoption of rules by March 31, 1989 to require plastic containers to be labeled to identify constituent resins to promote recycling
* the MPCA adopted new and modified the existing rules regarding solid waste management facilities

Another major piece of legislation passed during this time was the Minnesota Environmental Response and Liability Act of 1983. This legislative act created an environmental response, compensation and compliance fund to finance the clean up of releases of hazardous substances or pollutants and contaminants when the responsible party is unwilling or unable to take adequate actions. The legislation complements the federal Superfund Act discussed later.

History of Federal Policy Development

The federal government began to take action on solid waste in 1964 with moneys appropriated for solid waste management research. However, three major pieces of legislation have really set the direction for solid waste management at the national level. The National Environmental Policy Act of 1970 broadened the powers of the EPA and focused attention on environmental matters. In 1976, the Resource Conservation and Recovery Act (RCRA) was enacted to provide technical and financial assistance for the development of management systems and facilities for the recovery of energy and other resources from discarded materials, the development of environmentally sound disposal, and the regulation of hazardous waste. RCRA was reauthorized in 1984 and required EPA to develop reports to Congress on the status and need for additional solid waste regulation. EPA must also revise the criteria for operating mixed municipal solid waste land disposal facilities.

The last piece of major federal legislation, the Comprehensive Environmental Response, Compensation, and Liability Act, was passed in 1981. The Act, commonly called Superfund, provides a mechanism to clean up releases of hazardous substances. Superfund was reauthorized and amended in 1986 in a manner that may severely restrict the future use of Superfund moneys at solid waste facilities because it requires a permanent solution to the problem. This may not be practical at land disposal facilities as it could be interpreted as removal of the waste.

The federal government through EPA is currently focusing on air quality emissions and ash management from solid waste incinerators. Congress is debating legislation that would place more stringent controls on incinerator owners and operators and

on states. The EPA is discussing rule changes to address the concerns surrounding these issues.

History of Local and Regional Involvement

Along with the state and federal units of government, local units have specific solid waste management authorities. In 1957 under Minn. Stat. ch. 450, local units of government within 25 miles of Minneapolis were authorized to work together as a sanitary authority to obtain property and operate disposal facilities and establish rules governing solid waste disposal. Only one authority was created. By 1970, six more authorities were authorized under special legislation.

In 1969, the legislature enacted the Metropolitan Area Solid Waste Management Act, which authorized the Metropolitan Council to adopt a comprehensive plan for solid waste in the Metropolitan Area. In 1971, the counties outside the Metropolitan Area were given authority to conduct solid waste programs, to complete plans, to acquire and dispose of property, construct and operate facilities, enter into management and service contracts, establish service areas and service charges, issue revenue and general obligation bonds or tax to finance disposal systems. Counties were required to periodically inspect waste facilities to obtain and maintain compliance with state rules and cooperate with the MPCA in the development and implementation of a system for recovery and use of materials and energy from solid waste. This direction is contained in Minn. Stat. ch. 400.

Policy Summary

In summary, the major policies developed in statutes to attain the goal of minimizing risk to human health and the environment are as follows:

1. Development of enforceable standards to protect air, land, water and human health (Minn. Stat. chs. 116, 116B, 116D, 400, 473);

2. Develop methods to reduce waste generation, minimize resource depletion, recover materials and energy, and abate land disposal (Minn. Stat. chs. 115A, 116A, 116F, 400, 473);

3. Provide adequate resources through financial planning, grants, and loans (Minn. Stat. chs. 115A, 116, 400, 473);

4. Develop planning and management structures that include private sector involvement (Minn. Stat. chs. 115A, 116C, 116D, 116F, 400, 473);

5. Provide for citizen input (Minn. Stat. chs. 116B, 116D, 116E);

6. Provide technical assistance (Minn. Stat. chs. 115A, 116F);

7. Consider economic viability and factors when implementing programs (Minn. Stat. chs. 115A, 116, 116D, 473);

8. Recognize regional differences in standards, materials conservation, planning, and grant priorities (Minn. Stat. chs. 116, 116F, 115A); and

9. Develop coordinated efforts among various entities and cooperation among state agencies (Minn. Stat. chs. 116C, 116D, 115A).

(See Appendix B for a table of statutory programs.)

CHAPTER III: CURRENT ROLES AND PROGRAMS

Introduction

Solid waste management is affected by many laws and statutes. Whether it is the federal Resource Conservation and Recovery Act (RCRA) or Minnesota's Waste Management Act, laws have established specific roles for the federal, state, and local government in controlling how solid waste is managed in a manner that protects human health and the environment. It is important to understand what the roles are for each level of government.

Federal Program Overview

Federal programs that impact solid waste management are found in RCRA, the Clean Water Act, the Safe Drinking Water Act, the Clean Air Act, the Toxic Substances Control Act, and the Comprehensive Environmental Response, Compensation, and Liability Act. These acts and the rules and guidelines established at the federal level establish standards for emissions and discharges that are designed to reduce risk. States are encouraged to conduct programs that implement these goals. For many such programs, federal money is made available to the states for program implementation. However, no federal money has been allocated for solid waste since 1984.

The U. S. Environmental Protection Agency (EPA) has regulations for solid waste management. These regulations are found in Chapter 40 of the Code of Federal Regulations, Parts 256 and 257. (40 CFR Parts 256 & 257.) These parts establish state solid waste management planning guidelines and specific criteria for siting and managing solid waste land disposal facilities. Currently, the enforcement of these criteria is the responsibility of each state, and is spotty due to limited resources. The federal program is undergoing change. The EPA is revising its criteria for mixed municipal solid waste land disposal facilities. Programs are being developed to control emissions from incinerators and to establish solid waste incinerator ash testing and management standards.

State Agency Overview

Minnesota has long been looked upon as a leader in solid waste programs. Until October of 1988, activity at the state level was divided among the MPCA, WMB, Department of Administration, Minnesota Environmental Education Board, State Planning Agency, and the Department of Trade and Economic Development. As noted above, the solid waste functions formerly performed by the WMB have been merged into the MPCA. The Minnesota Department of Health establishes standards for contaminants that effect human

health including recommended allowable limits (RAL), and maximum contaminant levels (MCLS) in drinking water, and defines tolerable risk.

The MPCA Division of Ground Water and Solid Waste is responsible for permitting facilities, establishing standards, monitoring, enforcing the standards, and training and certifying facility personnel who operate or inspect disposal facilities. The MPCA Office of Waste Management Grants and Assistance (formerly the WMB) is responsible for county solid waste planning, grant and loan programs, waste education coordination, market development for recyclables and compost, and technical assistance. Waste tire management, formerly the responsibility of the WMB, is now the responsibility of the MPCA Office of Waste Tire Management. The Department of Administration is responsible for establishing recycling programs in state agencies. The Minnesota Environmental Education Board establishes school curricula and other programs to educate Minnesota's citizens on environmental issues. The State Planning Agency is responsible for coordinating legislative activities and specialized programs. The Department of Trade and Economic Development's efforts are geared to the development of markets for solid waste to encourage recycling and reuse of this material.

MPCA-Background

The Governor appoints a nine-member citizen board. In addition to the citizen board and an Administrative Office, the MPCA is divided into four divisions of Air Quality, Water Quality, Hazardous Waste, and Ground Water and Solid Waste; and three offices, Waste Management Grants and Assistance, Waste Tire Management, and Planning and Review. Internal review of problems and proposals often cross divisional lines. Many of the cross-programmatic issues are resolved in the environmental review process. The Office of Planning and Review prepares the environmental documents, Environmental Assessment Worksheets and Environmental Impact Statements, for projects requiring MPCA permits in Greater Minnesota. The Metropolitan Council conducts environmental reviews for the Metropolitan Area. The environmental review process is designed to evaluate issues and determine the potential for significant impact from facility construction before a facility is built. The effectiveness and need for environmental protection is evaluated and the controls become permits conditions.

The MPCA began its involvement in regulating solid waste management about 20 years ago. With this experience has come knowledge, which has caused the MPCA to change programs in order to effect change that protects human health and the environment. In 1970, the MPCA adopted solid waste regulations. The rules were revised in 1973 in order to control leachate problems at land disposal facilities, prohibit hazardous waste and other

undesirable wastes from disposal, and establish closure requirements. In 1979, the rules were revised once again to establish less restrictive operating standards for facilities located in sparsely populated areas.

In 1981, monitoring data at land disposal facilities began to indicate existing controls were inadequate for protecting ground water. In 1982, the MPCA began to upgrade permits to include provisions for increased hydrogeologic investigations, monitoring, and design standards. The MPCA also began reviewing and redrafting the existing solid waste rules. The revised rules were adopted in September 1988.

Current MPCA program activities include:

* Permit issuance and environmental review;
* Standard development;
* Permit enforcement;
* Emergency and site response (Superfund);
* Operator and inspector training and certification;
* Household hazardous waste program development;
* Technical and financial programs; and
* Coordination of waste education.

In addition to the above activities, staff time is also dedicated to other activities including special projects, information requests, and training. As much as 20 percent of staff time is spent on special projects such as participation on task forces, open dump inventories, answering letters, legislative updates, arranging inspections, reviewing special waste disposal options, and developing enforcement policies. Eighteen percent of the staff's time is devoted to information requests.

Staff turnover results in a significant amount of time being spent in new employee training. Enforcement and permit staff must understand agency operating procedures, enforcement strategies, site history, and current enforcement status of a site in order to be effective. In 1987, orientation training for new staff required ten percent of available work hours. Basic training requirements include:

* Employee orientation;
* MPCA regulation training;
* First Aid;
* Cardiopulmonary Resuscitation;
* Defensive Driving;
* Health Monitoring; and
* Personal protection and safety.

Because the staff is involved in many different activities and has many responsibilities, staff time cannot be entirely committed to enforcement activities. This is only one

constraining factor in how quickly enforcement and permitting occur. Other factors involve Attorney General priorities, the permittee's response to requested actions, and limitations on the consulting community resources to provide the requested information.

Permitting Program

The MPCA issues permits pursuant to the authorities granted it in Minn. Stat.chs. 115 and 116. Specific permit requirements are found in Minn. Rules ch. 7001. The technical standards for solid waste management are found in Minn. Rules ch. 7035. Air quality standards are found in Minn. Rules ch. 7005 The environmental review program is governed by Minn. Rules ch. 4410. Facility owners and operators must demonstrate that the proposed activity can meet standards established in law and rules. Public notice and opportunity for public comment provisions are included in the permit process. Permits are issued for no more than five years.

The objectives of the permit program are:

* To conduct technical and environmental reviews for permit issuance;
* To conduct technical reviews of closure plans and construction certifications;
* To continue to upgrade permits on a priority basis;
* To assist enforcement staff by providing technical assistance and review;
* To act as instructors at training courses;
* To assist Superfund staff by providing technical reviews; and
* To interface with pertinent state agencies and local government to address all issues.

Permit review staff consider how proposed facility designs and operations will be capable of protecting human health and the environment. This means all facilities must be judged in relation to a consistent standard. Technical standards for the design, construction, and operation of solid waste management facilities are found in Minn. Rules ch. 7035. Minn. Rules pts. 7005.0600 to 7005.0650 establish emission standards for solid waste incinerators. Minn. Rules ch. 7060 establishes standards to preserve and protect underground waters by preventing new and abating existing pollution. The nondegradation policy of part 7060.0500 is the basis of many MPCA enforcement actions.

Standards and Enforcement

All standards are subject to change as new information becomes available. Research is conducted to determine the suitability of specific standards by identifying and quantifying the risks

associated with specific standards. Establishing acceptable risk levels is a difficult process. The MPCA relies on the U.S. EPA, the Minnesota Department of Health, and other scientific research to establish these levels. The acceptable risk level established by the EPA and the Minnesota Department of Health is one additional death or injury per 100,000 population exposed over a 70-year period. This risk level is also used by the MPCA Board in making permit issuance decisions.

The technical review and permit process is only as effective as the enforcement program used to ensure compliance. Enforcement is a multi-faceted and complex program. Enforcement priorities and methods depend on the history of noncompliance, resources available, risks to human health and the environment, and other factors. Enforcement tools used by the MPCA include:

* Compliance permits;
* Inspections;
* Notices of violation;
* Stipulation agreements;
* Orders; and
* Litigation procedures.

Enforcement activities require careful documentation, making them time intensive. The number of hours required for negotiation and preparation of enforcement documents ranges from 50 hours for each compliance permit to years for litigation activities. Stipulation agreements may take 120 hours or more and closure orders may take as much as 500 hours for completion. In addition to the enforcement activities described above, enforcement staff are responsible for developing policy papers on the management of specific wastes, answering complaints, review of codisposal requests, legislative updates, and special task force work.

The objectives of the enforcement program are:

* To ensure that facilities are operated in an environmentally sound manner by maintaining compliance with MPCA rules and permits;
* To act as a focal point for the coordination between permit staff and regional inspectors;
* To coordinate with Superfund staff in developing a strategy for future site nominations for the National Priorities List and the Permanent List of Priorities;
* To provide review of industrial waste disposal practices; and
* To respond to complaints.

Superfund Activities

The State Superfund Law (the Minnesota Environmental Response and Liability Act of 1983) provides the authority to the MPCA to use

funds to administer the program and finance response actions. Response actions include remedial investigation, feasibility studies, cleanup actions, and emergency actions.

In Minnesota, the Superfund program has emphasized seeking out and securing responsible party commitments for cleanups, limiting the use of public funds to situations where no viable responsible party exists or where a party is unwilling to cooperate. Currently, Minnesota has 139 hazardous waste sites on its Permanent List of Priorities. Of this, 51 mixed municipal solid waste land disposal facilities are on the state Permanent List of Priorities and ten are on the federal list. Response actions have been initiated at 83 of these sites. Responsible parties are conducting and financing 59 of these actions and 24 actions are being funded by state and/or federal Superfund money.

The Superfund program is used as an investigation, enforcement, and cleanup tool. Ground water contamination has been documented at nearly every mixed municipal solid waste land disposal facility that has been properly monitored. The evaluation program that establishes the criteria for placement on the list, Minn. Rules ch. 7044, is based on size, location, potential for environmental degradation, known or suspected presence of hazardous materials, and other criteria.

The objectives of the Superfund program are:

* Implementation of Superfund activities;
* To administer contracts for investigation and cleanup at Superfund sites when no responsible party actions are at work;
* To review proposals and reports on feasibility studies and response action; and
* To develop and implement procedures that efficiently coordinate inter and intra-agency actions regarding design and implementation of remedial action.

Certification and Training

Compliance with laws and rules requires an understanding of these regulatory tools and the land disposal facility one is operating. The MPCA, under Minn, Stat. § 116.41, subd. 2, has developed standards and training programs for operators and inspectors of waste disposal facilities. Minn. Rules ch. 7048 establish the requirements, procedures, and qualifications necessary to become certified and retain certification. There are no training and certification programs required for compost or waste-to-energy facility operators or inspectors.

The objectives of the training and certification program are:

* To conduct programs so solid waste facilities are operated and inspected by qualified personnel;
* To develop implementation manuals for MPCA rules; and
* To develop strategies and programs to improve and maintain internal and external communications.

Household Hazardous Waste Programs

Ground water contamination at mixed municipal solid waste land disposal facilities and emission/ash concerns at solid waste incinerators are often attributed to the amount of household hazardous waste delivered to these facilities. Minnesota is in the process of developing one of the most progressive, full-service household hazardous waste programs in the nation. The program grew out of a Legislative Commission on Minnesota Resources funded program from 1985 to 1987. The program showed that household hazardous waste could be safely, efficiently, and effectively collected from citizens. Over 2,800 households participated in 14 separate collection projects.

The 1987 legislature authorized the MPCA to develop a permanent household hazardous waste program. The goal of this program is to enable every citizen to manage household hazardous waste in a manner that protects themselves, public health, and the environment. The program has three major elements:

* Public Education/Waste Reduction - statewide hotline and education materials;
* One Day Collection Projects - continuation of existing program; and
* Ongoing Collection - satellite collection points for permanent collection.

Local community involvement is necessary for the household hazardous waste program to be successful.

Assistance for Solid Waste Processing, Separation, and Reduction Projects

The Waste Management Act established a number of programs designed to improve the management of solid waste in the state. These programs are for the most part aimed at providing technical and financial assistance for the development of facilities and services to further the goal of landfill abatement in the state.

The MPCA has a number of financial and technical assistance programs designed to assist in the development of landfill abatement activities.

1. A Processing Facilities Demonstration Program (DEMO) has, since 1984, provided financial assistance in the development of eight facilities around the state, including waste-to-energy, recycling, and composting facilities. Approximately $4.4 million has been awarded to date and approximately $400,000 remain in the program.

2. A Capital Assistance Program (CAP) provides grants for solid waste processing facilities and transfer stations serving processing facilities. This program has funded 12 waste-to-energy facilities and transfer stations around the state. Approximately $7.9 million in grants have been awarded and slightly under $10 million remain in the program. Table III-1 summarizes some of the information regarding the DEMO and CAP programs.

3. A Reduction and Separation (Low-Tech) Program provides funds for recycling and waste reduction activities. Funded at a level of $300,000 by the legislature in 1987, the program has assisted six projects around the state and all funds are now expended.

4. An Environmental Testing Grant Program (TEST) assists in financing the costs of tests necessary to determine the appropriate pollution control equipment or the environmental effects of any product or material produced by a processing facility. This program is funded out of the CAP funds. To date, four grants have been awarded, totalling approximately $250,000.

Map III-1, and Tables III-1 to III-4 summarize the projects funded under these four programs. Awards under the DEMO, CAP, and Low-Tech programs total $12,865,778 in grants and loans. Composting and recycling programs have received 27 percent of the funds, 51 percent has gone to mass burn projects, 11 percent has been awarded to refuse derived fuel (RDF) projects, 8 percent to tire processing facilities, and 3 percent to transfer stations serving resource recovery facilities. These figures include two recent grants (Mower County Recycling Facility and Swift County Recycling and Composting Facility) not shown on the tables and maps.

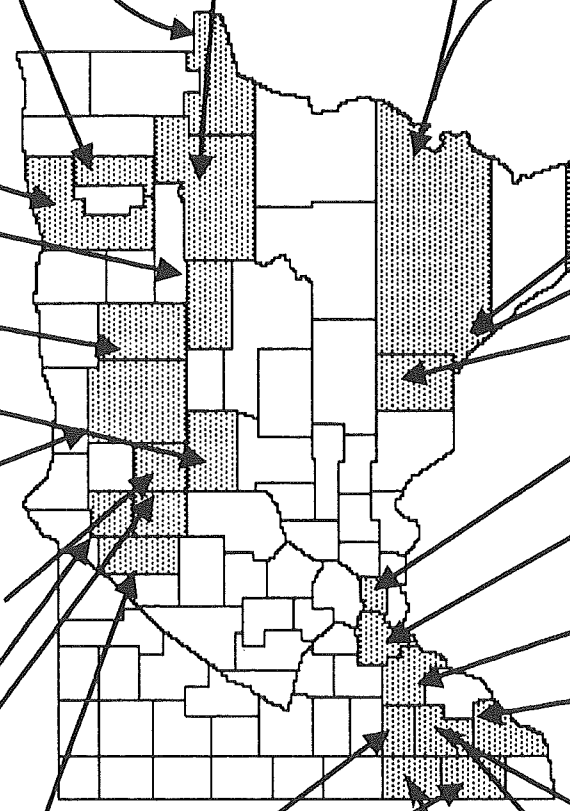
In addition to these technical and financial assistance programs, the MPCA has a number of other responsibilities relating to improved solid waste management in the state:

1. A Market Development Program, established by the legislature in 1987, assists in the development of markets for recyclables and compost in the state. This program has two major elements: the first is a grant program to persons seeking to develop facilities or services that will result in the greater market availability for recyclables and/or compost in the state. The grants are limited to $50,000 and require a 50% match. In September 1988, a grant to assist in studying the feasibility of a plastics recycling facility in the state was awarded. Second, the program provides assistance in the encouragement of

MAP III-1

PROJECTS

JULY, 1988



Lake of the Woods - a $199,750 grant and a $199,750 loan to build three integrated recycling and composting facilities.

Pennington County -- a $782,413 grant and loan to build a densified refuse-derived fuel facility in Thief River Falls Also, a $5,965 grant under the TEST Program for environmental testing of air emmissions from the facility.

Polk County -- $1.5 million grant to help build a $7.9 million solid waste resource recovery plant (WRRP) near Fosston. Plant will handle waste from Polk, Norman, Mahnomen, Clearwater, and Beltrami Counties. Also, a $82,180 grant to conduct air emissions testing at the WRRP.

Hubbard County -- $86,825 grant to help build two solid waste transfer stations.

Otter Tail/Becker Counties -- $85,842 grant to build transfer stations in Detriot Lakes and Henning.

Todd County - a $72,187 grant to build a transfer station near Browerville.

Fergus Falls -- $862,500 to help build a $4.35 million waste-to-energy plant providing steam to the Regional Treatment Center. Plant will handle waste from Otter Tail, Grant, Stevens, Wilkins, Traverse, Becker, Hubbard, Wadena and Todd Counties.

Douglas County -- $37,500 LOW-TECH grant tofund a public education and recyclables collection program.

Stevens County -- $53,984 grant to help build a $215,934 transfer station near Morris that provides waste to the Fergus Falls Waste-to-Energy Facility.

Pope/Douglas Counties -- $1.6 million grant to help build a $6.5 million waste-to-energy plant in Alexandria.

Swift County -- a $37,500 grant under the LOW-TECH Program to integrate recycling program with composting facility.

Dodge County -- an award of $48,975 to build a transfer station near Mantorville that provides waste to the Rochester waste-to-energy facility.

Beltrami County -- a $46,000 grant to help fund a $186,000 solid waste transfer station near Bemidji.

St. Louis County -- a $586,400 grant for a $3 million waste tire processing plant in Babbitt. Plant can process 3.5 million tires per year.

St. Louis County -- a $290,000 grant and a $110,000 loan for an expansion of the tire processing plant in Babbitt.

Cook County -- a $62,755 grant to help fund a $125,510 county-wide recycling program.

Duluth -- a $600,000 grant and loan to install a waste separation/shredder un as part of the WLSSD project.

Duluth -- a $95,155 grant awarded under the TEST Program for air quality testing, as characterization, residual analysis and feedstock testing at WLSSD.

Carlton County -- a $94,562 grant to build a transfer station near Carlton.

Ramsey County -- a $609,750 grant and loan to build a recycled materials processing facility in St. Paul.

City of Red Wing - $14,875 grant to install continuous emissions monitoring equipment at the city's incinerator. Also, a $69,297 grant under the TEST Program for environmental testing of air emissions from the incinerator.

Goodhue County -- a $37,500 grant under the LOW-TECH Program to fund a public education/recycling program.

Winona County -- a $2 million grant to help fund a $12.9 million solid waste incinerator to handle solid waste from Winona, Wabasha, and Houston Counties, and from two counties in Wisconsin. Also, a $50,000 grant under the LOW-TECH Program to fund a public education and recyclable collection truck project.

Olmsted County -- a $600,000 grant and loan to help build a 200 ton/day mass burn waste-to-energy project in Rochester serving Olmstead, Dodge, and parts of Wabasha and Goodhue Counties.

Olmsted County -- a $644,000 grant and loan to build a recycled materials processing plant in Rochester serving Olmstead and Dodge Counties.

Fillmore County -- a $399,960 grant and loan to help build a solid waste composting plant in Preston. Also, a $50,000 grant under the LOW-TECH Program to fund a program of recyclable materials collection and public education.

Mower County -- a $37,500 grant under the LOW-TECH Program to fund a recycling program.

TABLE III-1

SOLID WASTE PROJECTS ASSISTED BY
WMB CAP AND DEMO PROGRAMS

SUMMARY DATA

JULY 1988

YEAR	NUMBER OF PROJECTS	TOTAL GRANTS	TOTAL LOANS	CAPACITY (tons/day)	RECYCLING	WASTE TO ENERGY		TRANSFER STATION	OTHER
						REFUSE DERIVED FUEL	MASS BURN		
1984	2	$577,250	$759,663*	131	1	1			
1985	6	$2,680,404	$944,150	692	1	1	2	2	
1986	6	$5,078,462	0	458			3	2	1 (tire processing)
1987	5	$804,459	$158,240	109	2 (one compost-recycling facility)			2	1 (tire processing expansion)
1988 through July	3	$286,812	$199,750	30	1 (integrated recycling - compost project)			1	1 (emissions monitoring equipment)
TOTAL	22	$9,427,387	$2,061,803	1420	5	2	5	7	3

*Includes Pennington County loan subsequently changed to grant.

SW/PR

TABLE III-2

SOLID WASTE PROCESSING FACILITIES FUNDED BY THE WASTE MANAGEMENT BOARD THROUGH CAP AND DEMO PROGRAMS

August 1984 - June 1988

Location Owner/Operator (WMB Program)	Facility Type	Capacity: TPD Design/Operating	Waste Assurance Method(s)	End Product	Operational * = Projected	WMB Award (Date)	% Capital Cost Funded by WMB	Other Financing Sources	Total Capital Cost
St. Paul: Ramsey County/Super Cycle (DEMO)	Recycled Materials Processing	76/76	None	Glass Metal Paper	July 1985	$277,250 Grant $277,250 Loan (Aug 29, 1984)	67	County Funds City of St. Paul Funds	$678,000
Thief River Falls:Pennington County/Future Fuel (DEMO)	Densified Refuse Derived Fuel	55/30	Hauler Contracts	dRDF Pellets	January 1985	$300,000 Grant $482,413 Loan* (Oct. 31, 1984)	59	G. O. Bonds	$1.4 million
Rochester: Olmsted County (DEMO)	Waste to Energy	200/180	Designation Ordinance	Steam Electricity	1987	$300,000 Grant $300,000 Loan (Jan. 27, 1985)	3	G. O. Bonds, Sale of Former State Hospital	$18 million
Duluth: City of Duluth/Western Lake Superior Sanitary District (DEMO)	Modification of RDF Processing	400/200	Limited Landfill Access (WLSSD Designation Authority)	RDF Fuel	1985	$300,000 Grant $300,000 Loan (May 23, 1985)	13	WLSSD Funds, G. O. Bonds	$4.6 million
Rochester: Olmsted County/Ability Building Center (DEMO)	Recycled Materials Processing	20/5	None	Glass Metal Paper	June 1986	$300,000 Grant $344,150 Loan (June 27, 1985),	88	County Funds	$735,500
Henning and Detroit Lakes: Ottertail & Becker Counties (CAP)	Transfer Stations	10/10Henning 40/60 Detroit Lakes	County Service Fee	MMSW used at Perham Incinerator	Sept. 1986	$ 85,842 Grant (Aug. 26, 1985)	25	Service Fee Revenue	$350,000

* In 1988, the legislature acted to forgive the Pennington County loan. Thus the entire amount is now grant funding.

TABLE III-2 CONTINUED

SOLID WASTE PROCESSING FACILITIES FUNDED FUNDED BY THE WASTE MANAGEMENT BOARD THROUGH CAP AND DEMO PROGRAMS

Location Owner/Operator (WMB Program)	Facility Type	Capacity: TPD Design/Opera-ting	Waste Assurance Method(s)	End Product	Operational * = Projected	WMB Award (Date)	% Capital Cost Funded By WMB	Other Financing Sources	Total Capital Cost
Carlton: Carlton County (CAP)	Transfer Station	50/44	Limited Landfill Access (WLSSD Designation Authority)	MSW used at WLSSD Coincinerator	1986	$94,562 Grant (Aug. 26, 1985)	23	County Funds IRRRB Funds WLSSD	$405,000
Alexandria: Pope & Douglas Counties (CAP)	Waste to Energy	72/50	Hauler Contract	Steam	1987	$1,600,000 Grant (Oct. 31, 1985)	24	G. O. Bonds	$6,550,000
Babbit St. Louis County/ Rubber Research Elastomerics (CAP)	Tire Processing and Reclama-tion	3 million/ 900,000 (tires)	Statewide Tire Ban	Rubber Fiber Steel	1987	$586,412 Grant (Jan. 16, 1986)	25	IRRB DEED County Funds	$2,345,647
Fergus Falls: City of Fergus Falls(CAP)	Waste to Energy	80/	Service Fee Contracts with Counties	Steam	1988	$862,500 Grant (May 2, 1986)	20	G.O. Bonds City Funds Pollution Control Grant	$4,355,000
Mantorville: Dodge County (CAP)	Transfer Station	12/10	Designation Ordinance	MMSW used at Olmsted Co. Incinerator	1986	$48,975 Grant (May 2, 1986)	23	County Funds AMC Loan	$215,000
Fosston: Polk County (CAP)	Waste to Energy	100/	Contracts with Counties & Haulers	Steam	1988	$1,493,750 Grant (Sept. 11, 1986)	21	G. O. Bonds DEED Grant	$6,978,000
Winona: Winona County (CAP)	Waste to Energy	150/	Contracts with Counties; Hauler	Steam Electricity	*1989	$2,000,000 Grant (Oct. 9, 1986)	15	G. O. Bonds	$12,930,228

WP/SW/PR/ExS//KM:eh

TABLE III-2 CONTINUED

SOLID WASTE PROCESSING FACILITIES FUNDED BY THE WASTE MANAGEMENT BOARD THROUGH CAP AND DEMO PROGRAMS

Location Owner/Operator (If different)	Facility Type	Capacity: TPD Design/Operating	Waste Assurance Method(s)	End Product	Operational * = Projected	WMB Award (Date)	% Capital Cost Funded By WMB	Other Financing Sources	Total Capital Cost
Park Rapids and Guthrie: Hubbard County (CAP)	Two Transfer Stations	21/	County Service Fee	MSW used at Fergus Falls Incinerator	1987	$86,825 Grant (Dec 18, 1986)	25	County Solid Waste Mgmt. Funds	$347,300
Preston: Fillmore County (DEMO)	Compost-Recycling Facility	25/20	Agreements with Cities	Compost, Glass, Paper, Plastic, Metal, etc.	1988	$351,720 Grant $48,240 Loan (March, 26, 1987)	55	County Funds	$733,440
Bemidji: Beltrami County (CAP)	Transfer Station	61/42	Contracts with Haulers	MMSW used at Polk Co. Incinerator	1987	$46,000 Grant (April 23, 1987)	25	County Funds	$186,000
Grand Marais: Cook County (DEMO)	Recycling Center	1/1	None	Glass, Metal, Paper, etc.	1987	$62,755 Grant (May 28, 1987)	50	County Funds	$125,510
Babbitt; St. Louis County/ Rubber Research Elastomerics (DEMO)	Tire Processing and Reclaimation	3 million/ 900,000 (tires)	Statewide Tire Ban	Rubber, Fiber, Steel	1987	$290,000 Grant $110,000 Loan (Aug. 27, 1987)	68	IRRB DEED County Funds	$590,000

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TABLE III-2 CONTINUED

SOLID WASTE PROCESSING FACILITIES FUNDED BY THE WASTE MANAGEMENT BOARD THROUGH CAP AND DEMO PROGRAMS

Location Owner/Operator (If different)	Facility Type	Capacity: TPD Design/Operating	Waste Assurance Method(s)	End Product	Operational * = Projected	WMB Award (Date)	% Capital Cost Funded By WMB	Other Financing Sources	Total Capital Cost
Morris: Stevens County (CAP)	Transfer Station	22/14	Agreement with Haulers	MSW used at Fergus Falls Incinerator	1988	$53,984 Grant (Nov. 19, 1987)	25	County Funds	$215,934
Baudette: Lake of the Woods County (DEMO)	Integrated Recycling and Compost Project	10/	No Alternative Management Facilities Available	Glass, Metal, Paper, Plastic, Compost	*1989	$199,750 Grant $119,750 Loan (March 24, 1988)	99	County Funds	$399,950
Red Wing: City of Red Wing (CAP)	Waste to Energy	72/72	Informal Agreements with Haulers	Steam	1982 Facility Operational; *1988 Emissions Monitoring Equipment Installation	$14,875 Grant for Emissions Monitoring Equipment (January 28, 1988)	25	City Funds	$59,500 for Emissions Monitoring Equipment
Browerville: Todd County (CAP)	Transfer Station	20/	County Service Fee	MSW used at Fergus Falls or Perham Incinerators	*1988	$72,187 Grant (March 24, 1988)	21	County Funds	$341,750

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TABLE III-3
SOLID WASTE MANAGEMENT PROJECTS FUNDED BY WASTE MANAGEMENT BOARD THROUGH LOW-TECH GRANTS PROGRAM
JULY, 1988

Applicant	Project Manager/ Operator	Project Type	Capacity: TPD Design/Operating	Operational *projected	WMB Award (date)	% Project Costs Funded by WMB for First Year	Other Financing Sources	Projected Cost for First Year
Fillmore County	Fillmore County/ Private Haulers	Public Education Recyclable and Compostable Collection	12/	1988*	$50,000 (April 28, 1988)	45	County Funds	$112,158
Winona County	Winona County/ ORC Industries Inc.	Public Education, Recyclables Collection Truck	7/	1988*	$50,000 (June 30, 1988)	35	County Funds	$143,656
Swift County	Swift County/ Local Haulers	Public Education, Recyclables Collection, Collection Trailer, Drop Boxes	2/	1989*	$37,500 (August 25, 1988)	28	County Funds	$134,590
Goodhue County	Cannon Valley Environmental Coalition/Local Hauler	Public Education, Recyclables Collection, Containers, Trailers	2/	1988*	$37,500 (August 25, 1988)	35	County Funds, City of Cannon Falls, Local Hauler	$105,067
Mower County	Mower County/Cedar Valley Rehabilitation Workshop	Public Education, Curbside and Drop-off box, Recyclables Collection Trailer	2/	1988*	$37,500 (August 25, 1988)	15	County Funds	$252,333
Douglas County	Douglas County/ Local Hauler	Public Education Curbside and Drop-off box Recyclables Collection Collection Trailer	2/	1988*	$37,500 (August 25, 1988)	35	County Funds	$107,019

Table III-4

ENVIRONMENTAL TESTING PROJECTS FUNDED BY THE WASTE MANAGEMENT BOARD THROUGH THE TEST PROGRAM

JULY 1988

Location Owner/Operator (if different	Facility Type	Project Type	Requested Grant Amount	WMB Award (date)	% Project Costs Funded by WMB
Duluth: WLSSD	Modification of RDF Processing	Air Quality Ash Characterization	$95,155	$95,155 (October 22, 1987)	100
Fosston: Polk County	Waste to Energy	Air Quality	$89,180	$82,180 (January 28, 1988)	92
Red Wing: City of Red Wing	Waste to Energy	Air Quality	$71,747	$69,297 (May 26, 1988)	97
Thief River Falls: Pennington County	RDF Facility	Particulate Emissions Testing	$ 5,965	$ 5,965 (May 26, 1988)	100

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procurement policies and practices that emphasize reduction and recycling.

2. A Waste Education program, established by the legislature in 1987 at a funding level of $190,000 for the biennium, has responsibility for developing and implementing a program of public education on waste management. The majority of the work is done through the Waste Education Coalition, described in greater detail in the chapter and background paper on Waste Education.

3. Industrial Waste Programs, including planning, technical assistance, and financial assistance for the improved management of nonhazardous industrial wastes, include grants for reduction and for processing facility development, and technical assistance through the Minnesota Technical Assistance Program (MnTAP).

4. Waste Tire Programs include waste tire dump abatement, facility permitting, and waste tire processing grant and loan programs. A separate Tire Progress Report was submitted to the legislature in November 1988.

5. Used Oil Management technical and financial assistance includes grants to counties for the purchase and installation of storage tanks to collect used oil and loans for the purchase of used oil processing equipment. Finally, the Board recently awarded a $50,000 matching grant to a company to perform an economic feasibility study of a used oil recycling facility in the state.

6. The state's County Planning and Certificate of Need assistance and approval program and assistance and approval of local designation (flow control) activities. These responsibilities are discussed in detail in the chapter on County Planning.

Table III-5 shows an overview of staffing and funding levels for these programs.

Other State Agency Roles

Other state agencies have responsibilities related to the management of solid waste in the state.

1. The Environmental Quality Board's (EQB) activities in the area of waste have recently focused on waste education and are discussed in that chapter and background paper.

2. The Department of Administration (DOA) is charged with responsibility for administering a State Government Resource Recovery Program. This program includes stimulating the recycling and reuse of products in state government and the encouragement of procurement practices which emphasize the use of recycled materials. DOA is also responsible for enforcing the Governor's Executive Order on recycling. Further information on these programs will be found in the chapters on recycling and reduction.

TABLE III-5

FUNDING LEVELS

THROUGH JULY 1988

PROGRAM NAME (Year Program Established)	STAFF COMMITMENT	FUNDS CURRENTLY AVAILABLE/DEDICATED	TOTAL GRANT/LOAN SPENDING TO DATE	SOURCE OF FUNDS
SOLID WASTE TECHNICAL AND FINANCIAL ASSISTANCE • DEMO (1980) • CAP (1985) • LOW-TECH (1987) • TEST (1987)	6	$ 413,525 9,848,991 150,000 Funding Through CAP	$ 4,443,278 7,908,412 0 252,597	Gen. Ob. Bonds " " Gen. Rev. Funds
MARKET DEVELOPMENT (1987)	3	200,000 ($130,000 available for grants)	0	General Fund
WASTE EDUCATION (1987)	2	190,000	75,025	General Fund
INDUSTRIAL WASTE (1987) • GRANTS • MNTAP	1.25 0.5	140,000 15,000	60,000	General Fund
WASTE TIRES (1987) • PERMITTING • PROCESSING FACILITY DEVELOPMENT • ABATEMENT	2 2 2	980,000 2,200,000	0 589,647	Motor Vehicle Transfer Fund
USED OIL (1988) • GRANTS • LOANS	0.25 0.25	$ 400,000 (through FY 1989)	0 0	Motor Vehicle Transfer Fund
COUNTY SOLID WASTE (1987) PLANNING ASSISTANCE (1987) SOLID WASTE DESIGNATION (1980) SOLID WASTE DISTRICTS (1980) SUPPLEMENTARY REVIEW (1980)	7	No specific appropriation. Covered under General Operations and Management Budget.	NA	General Fund

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3. The Environmental Education Board and State Department of Education have roles in the area of waste education. Their involvement is further described in the chapter on Waste Education.

4. The Department of Natural Resources (DNR) sponsors the Minnesota Clean Rivers Project to clean illegally dumped waste from lands over which the DNR has jurisdiction.

5. The Minnesota Department of Transportation (MnDOT) collects illegally dumped waste from roadsides and other state-owned land.

Local and Regional Government Roles

Local government and regional programs are important to solid waste management. Local government roles have been established in Minn. Stat. chs. 400 and 473. County involvement has varied from only regulatory to complete ownership and operation of solid waste management facilities. The Waste Management Act Amendments of 1984 further clarified county roles. Counties are required to plan, develop and implement programs that reduce their reliance on land disposal of solid waste. Counties must also determine land disposal capacity needs for a ten-year planning period.

The Western Lake Superior Sanitary District (WLSSD) was created by the legislature in 1971 (Minnesota Laws 1971, Chapter 478) to collect, treat, and dispose of sewage. The district includes parts of Carlton and St. Louis counties. In 1974, the legislature authorized WLSSD to regulate solid waste under a comprehensive solid waste management plan.

In the Metropolitan Area, the Metropolitan Council is responsible for developing a long-range policy plan. The major policies contained in the 1985 plan are:

* Termination of land disposal of unprocessed mixed municipal solid waste by 1990;
* Achieving an additional 4 percent waste reduction by 1990;
* Processing of 80 percent of solid waste including materials recovery, energy recovery and composting by 1990;
* Achieving an additional 16 percent source separation of recyclables and yard waste by 1990; and
* Coordination of education programs.

Counties in the Metropolitan Area are required to adopt and implement management plans that complement this regional plan.

Counties statewide are authorized to adopt ordinances for the protection of public health and the environment and to control nuisances. Enforcement of the ordinances is sporadic.

Cities have the authority to organize collection of waste, issue licenses for collection, zone property, abate nuisances, and conduct activities to protect the public health and welfare of their citizens. Cities may also own and operate resource recovery facilities and landfills. Cities are not required to report their activities to any state agency; thus, little information is available on their participation in the state's solid waste management system. However, in the Metropolitan Area they are required to implement recycling programs.

CHAPTER IV: COUNTY PLANNING

Introduction

The Waste Management Act requires all counties in Minnesota to complete comprehensive solid waste management plans. Counties in the Twin Cities Metropolitan Area complete their plans under procedures developed by the Metropolitan Council. Counties in Greater Minnesota complete plans under procedures administered by the MPCA. This county planning procedure is a key step in the development of improved waste management practices in the state. The act and rules implementing the planning process contain specific requirements for plan contents. In general, the process should result in a document which addresses the county's needs, identifies the most feasible and prudent alternatives for future waste management, and indicates how the county intends to develop and implement desirable alternatives. Cities and towns located within the county are encouraged to comply with the completed plan.

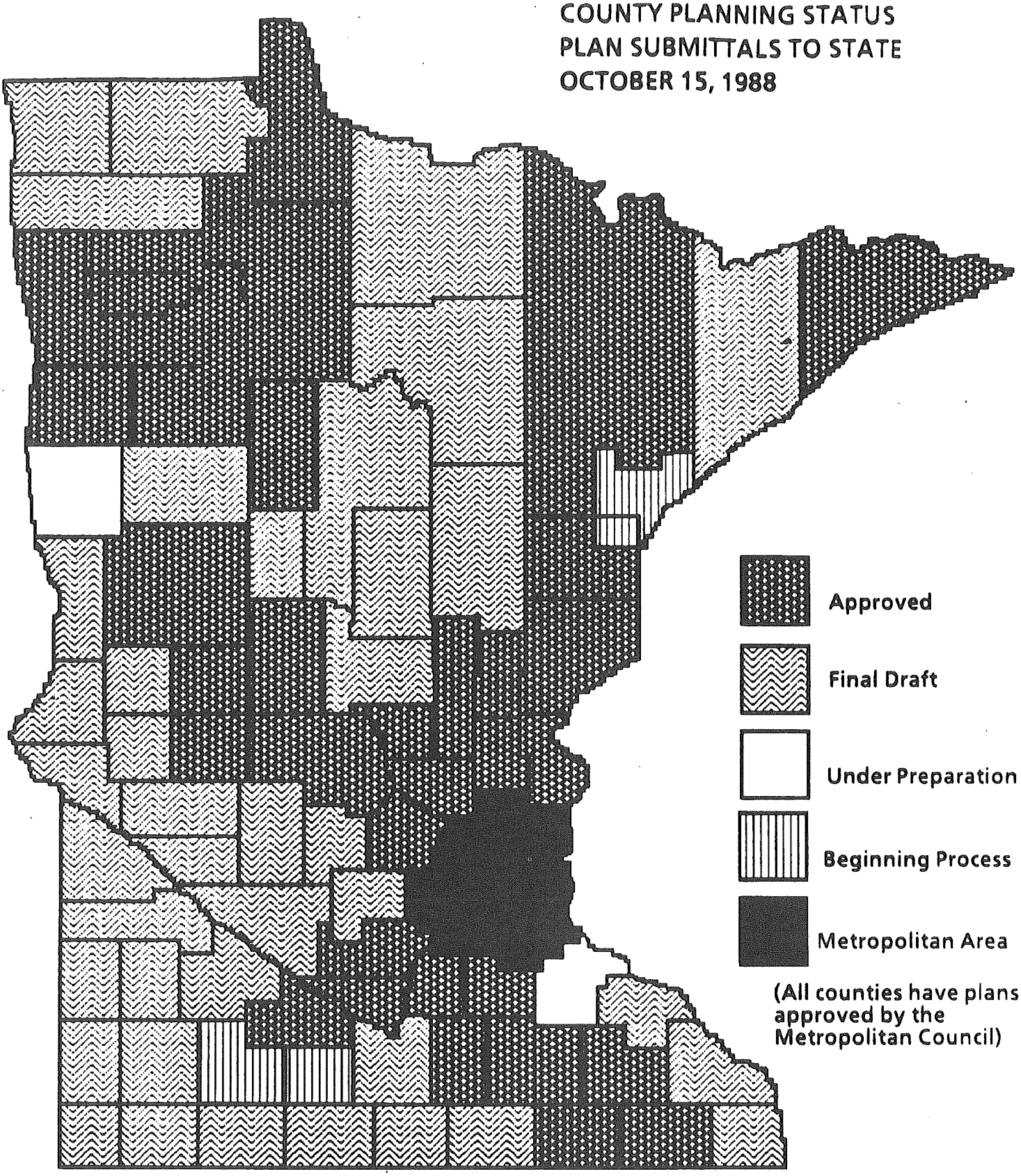
Closely linked to the planning process are the issuance of certificates-of-need for land disposal capacity and the development, where appropriate, of designation (flow control) plans and ordinances. The MPCA also administers these programs in Greater Minnesota.

Current Status of Planning Activities

As of September 1988, 37 of the 80 Greater Minnesota counties have had plans approved. Another 39 have submitted plans for review. Five plans are in the development stage, and three counties have just begun the planning process. (See Map IV-1). Because of the potential advantages of regional cooperation, many counties have worked or are working together to produce plans. Ten regional groups including 48 counties are working to jointly develop plans. (See Map IV-2). In general, counties have responded very well to the legislative mandate and the level of local planning activities taking place in Minnesota appears to significantly exceed that in most other states.

Because of the relatively recent completion date for most of the plans, the success in implementing the programs and projects proposed in plans is difficult and has not been evaluated. In the future as more counties develop implementation experience, it will be important to review and evaluate performance. While a systematic, county by county evaluation of plan implementation has not been done, it is possible to make some general, preliminary assessments of the process. The extensive development of waste to energy facilities, the growing number of composting projects, and increasing recycling activities in Greater

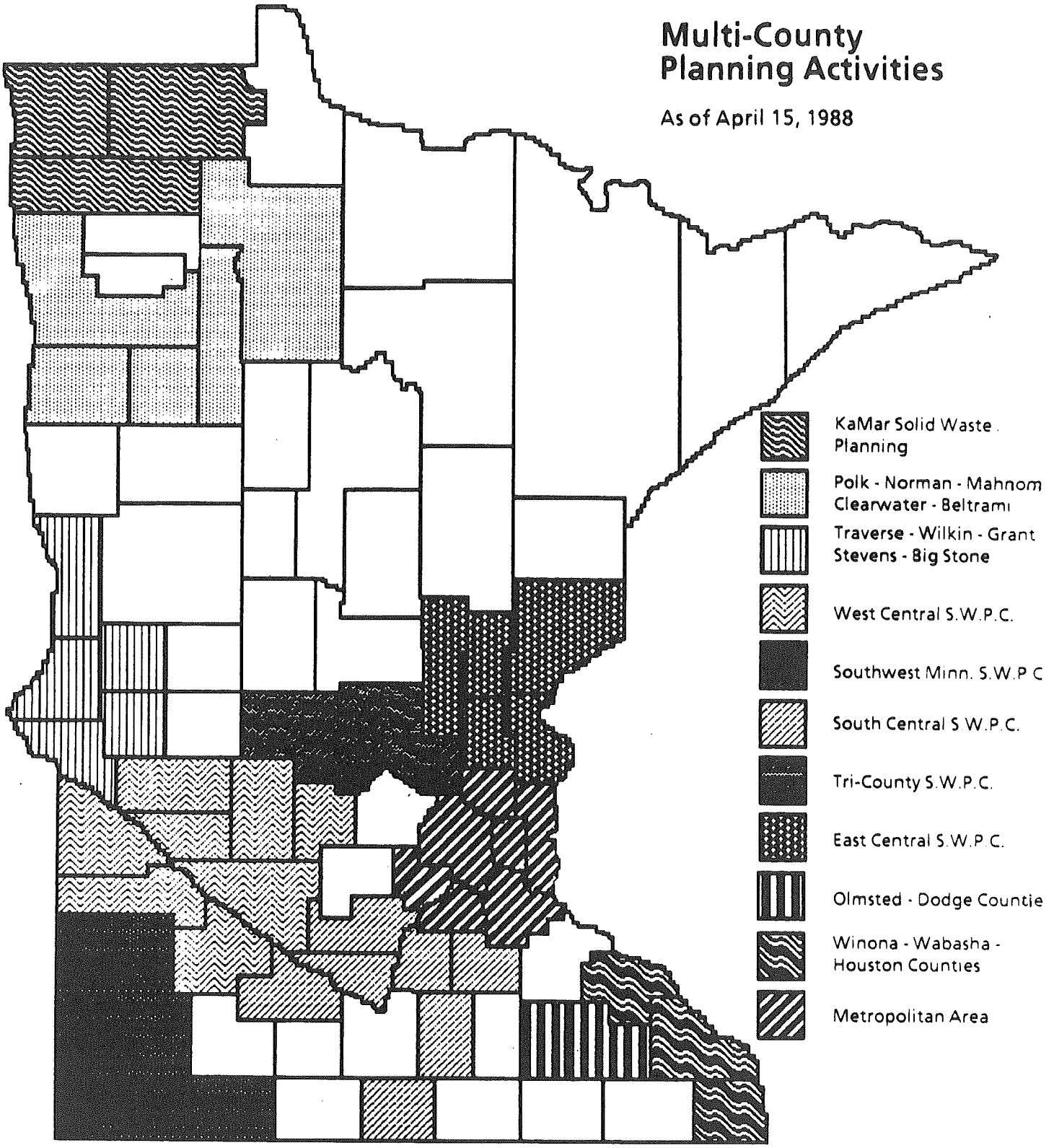
COUNTY PLANNING STATUS
PLAN SUBMITTALS TO STATE
OCTOBER 15, 1988



Waste Management Grants and Assistance /MPCA

WP/PR/ExS/

MAP IV - 2



WASTE MANAGEMENTGRANTS AND ASSISTANCE

10/ 31/88

Minnesota are, in the aggregate, general indicators of the progress being made in landfill abatement and resource recovery, two key goals of the planning process. However, as noted in the recycling background paper, the development of recycling activities in Greater Minnesota has not met expectations. The causes for this relatively slow development are discussed in the chapter and background paper on recycling.

Contents of Approved Plans

Specific requirements for county solid waste management plans are detailed in the Waste Management Act (Minn. Stat. §115A.46, subds. 1 and 2. (1986)) and the Comprehensive Solid Waste Management Planning and Certificate of Need Rule (Minn. Rules pts. 9215.0100-0250).

Plans are required to address the goals of the Act (Minn. Stat. § 115A.02):

* reduction in waste generated;
* separation and recovery of materials and energy from waste
* reduction in indiscriminate dependence on disposal of waste;
* coordination of solid waste management among political subdivisions; and
* orderly and deliberate development and financial security of waste facilities including disposal facilities.

In addition to a description of the current solid waste system in the county, plans are required to develop specific strategies and programs for waste reduction, recycling, yard waste composting, and MSW composting and/or energy recovery. Table IV-1 shows the tenth year landfill abatement goals for the county plans approved through 1987. While the detailed goals differ among counties, the Table clearly shows that counties are planning to significantly reduce their reliance on land disposal. The reader should note that these figures are goals and do not reflect the current status of implementation.

Other key requirements include addressing the following issues (Minn. Stat. §115A.46, subd. 2):

* encouragement of the ownership and operation of solid waste facilities by private industry; and
* development of criteria and standards to protect existing facilities from displacement.

Plans vary in terms of the level of attention to these goals, although, in general, they do not receive the same level of attention as the landfill abatement portions of the plans.

Table IV-1
Landfill Abatement Goals by County 1 (percentage by Weight)[2]
To be Achieved by Year 10

County/Author [1,4]	Date of Plan	Waste Reduction Goal	Recycling Goal	Yard Waste Composting Goal	MSW Composting and/orEnergy Recovery Goal	Land-fill[3]
Beltrami/SWO	1986 Addendum	2	20	8	53	17
Clearwater/SWO	1986 Addendum	2	20	8	53	17
Mahnomen/SWO	1986 Addendum	2	20	8	53	17
Norman/SWO	1986 Addendum	2	20	8	53	17
Polk/SWO	1986 Addendum	2	20	8	53	17
Pennington County	1984 Addendum	1	10	1	53	35
Cook/ARDC	1984 Addendum	1	3	1	-	95
Carlton/PRA	1986	1	1	1	27	70
Dodge/Bob Pulford	Amended 10/85	2	5	<1	34	59
Chisago/Hickok	1987	1	11	1	70	17
Isanti/Hickok	1987	1	11	1	74	13
Kanabec/Hickok	1987	1	11	1	74	13
Mille Lacs/Hickok	1987	1	11	1	54	34
Pine/Hickok	1987	1	11	1	60	27
Benton/HDR	1987 Addendum	1	10	9	44[4]	35
Sherburne/HDR	1987 Addendum	2	10	9	41[4]	38
Stearns/HDR	1987 Addendum	2	15	9	50[4]	24
Steele/RCM	1987	1	14	3	62	21

[1] For counties with plans approved through 1987.
Some plans do not contain goals.
[2] Totals may not add to 100 due to rounding.
[3] Does not include residuals
[4] ARDC - Arrowhead Regional Development Commission, HDR-HDR Techserv, Inc., Hickok-Eugene A. Hickok & Associates, PRA-Pope Reid Associates, RCM-Rieke Carrol Muller Associates, Inc., SWO-Solid Waste Officer, WSN-Widseth Smith Nolting & Associates, Inc

Minnesota Rules pts. 9215.0100-0250 set forth a schedule for submittal and revision of plans as well as a process for determining what is "feasible and prudent." Plans must contain a comparative cost analysis for the existing system, proposed system, and an alternative system. The cost of each component is adjusted using a formula to reflect environmental impacts, and summed for the ten-year period. The aggregate ten-year costs can then be compared for the existing, proposed, and alternative systems.

Regional Planning

Two types of regional organizations can be formed by counties to operate a solid waste management system. Minn. Stat. §471.59 authorizes two or more counties to enter into a cooperative agreement, called a "joint powers agreement" to jointly operate a solid waste management program. A joint powers agreement is a voluntary arrangement. Minn. Stat. §115A.63, subd. 2 authorizes the creation of waste management districts. The boards of two or more counties can request the creation of a district by petition to the MPCA. The petition must show that the counties are unable to use a joint powers agreement to accomplish the same purpose. A waste management district may include a county which does not voluntarily choose to participate.

Designation Planning

Minn. Stat. §115A.81, subd.2 authorizes counties to require "that all or any portion of the mixed municipal solid waste that is generated in its [a county or district's] boundaries or any service area thereof be delivered to a resource recovery facility identified by the district or county." At present, designation plans cannot be used to direct waste to land disposal, recycling, or yard waste composting facilities.

The designation process consists of two primary stages:

* a designation plan is developed by the county and approved by the State; and

* a designation ordinance is developed by the county and approved by the State.

Since the designation process was established by the legislature in 1982, designation plans for ten counties in Greater Minnesota have been reviewed and approved by the WMB.

Issues in County Planning

While the planning process is producing progress in solid waste policies and programs around the state, local planning and

implementation efforts continue to be affected by a number of barriers, including:

* historical lack of federal and state leadership;
* uncertainty regarding necessary environmental protection measures;
* the overall financial status of some counties;
* the existence of cheap landfill capacity;
* public attitudes;
* lack of markets for recovered resources;
* difficulties in inter-county cooperation;
* inefficient or ineffective past planning;
* lack of local leadership and expertise; and
* the lead time needed to effect change.

Acceleration of the implementation of improved waste management practices around the state will require that these barriers be addressed.

CHAPTER V: AMOUNT OF WASTE GENERATED

Introduction

No accurate, comprehensive data exist on the amount of solid waste generated in Minnesota. Further, no system is currently in place in the state to gather and aggregate this data. At best, what is available are estimates based primarily on land disposal facility receipt records (required by MPCA rules), hauler surveys done by individual counties in their solid waste planning efforts, and extrapolations from per-capita generation estimates done by consultant studies in the late 1970s and early 1980s.

Extrapolating from Land Disposal Data

The most consistent data regarding waste generation statewide comes from the reports submitted to the MPCA by all land disposal facility operators in the state. Beginning in 1980 this data was computerized and can be analyzed and tabulated easily. The reported data from land disposal facilities indicate that the amount of waste landfilled in the state has remained relatively constant since 1980 at approximately 10.2 million cubic yards per year. Using a conversion factor of 3.33 cubic yards per ton yields a per ton figure of slightly over 3 million tons per year.

While these data are perhaps the best available, they suffer from a number of limitations: first, the information provided is not audited; second, the majority of the state's landfills do not have scales so report in cubic yards which must be converted to tons using a very rough approximation; third, these numbers do not include any waste that is shipped outside of the state for disposal but do include waste imported for disposal into the state.

A more significant limitation of using land disposal facility reports for estimating total generation is that they do not capture waste that may be managed by other technologies. At the present time no aggregate data exists for these quantities. A 1986 estimate by MPCA staff put the total for these three activities at approximately 1.1 million cubic yards per year. This translates to a total generation estimate of 11.1 million cubic yards per year, which translates to a total generation estimate of approximately 3.3 million tons per year.

Aggregating County Estimates

Another approach to estimating total state waste generation is to sum the individual estimates being made by counties under the county planning process. MPCA staff utilized these estimates and other data in 1987 to develop a ton-per-day estimate for each

county in the state. These estimates are shown in Map V-1. Aggregating these figures gives an estimate of 3.25 million tons per year. This compares relatively closely with the 3.3 million ton estimate noted above. Table V-1 summarizes these estimates.

Per Capita Estimates

Another method frequently used by counties in estimating total waste generation is to make use of per-capita estimates derived from local studies such as hauler surveys and engineering estimates. For Greater Minnesota, a study frequently cited is the Minnesota Resource Recovery Plan (MRRP) done by Barr Engineering and Gordian Associates in 1979. Based on discussions with MPCA staff and on a review of the technical literature, this study developed per capita generation rates ranging from 2.0 to 3.6 pounds per capita per day, depending on the size of the community. This figure includes residential, commercial, and business waste, but does not include industrial waste or demolition debris.

Several other studies have been done in Minnesota and nationally which contain similar estimates. While most results fall within a similar range, results are very hard to compare in detail because of differences in the sector included (some include just residential, others include business and commercial) and differing population characteristics included in the residential category. Using the 3.3 million ton per year figure and dividing by the approximately 4 million population, produces a per capita, per day estimate for Minnesota of 4.3 pounds per day for all mixed municipal solid waste (including commercial, business, and institutional.)

Waste Composition

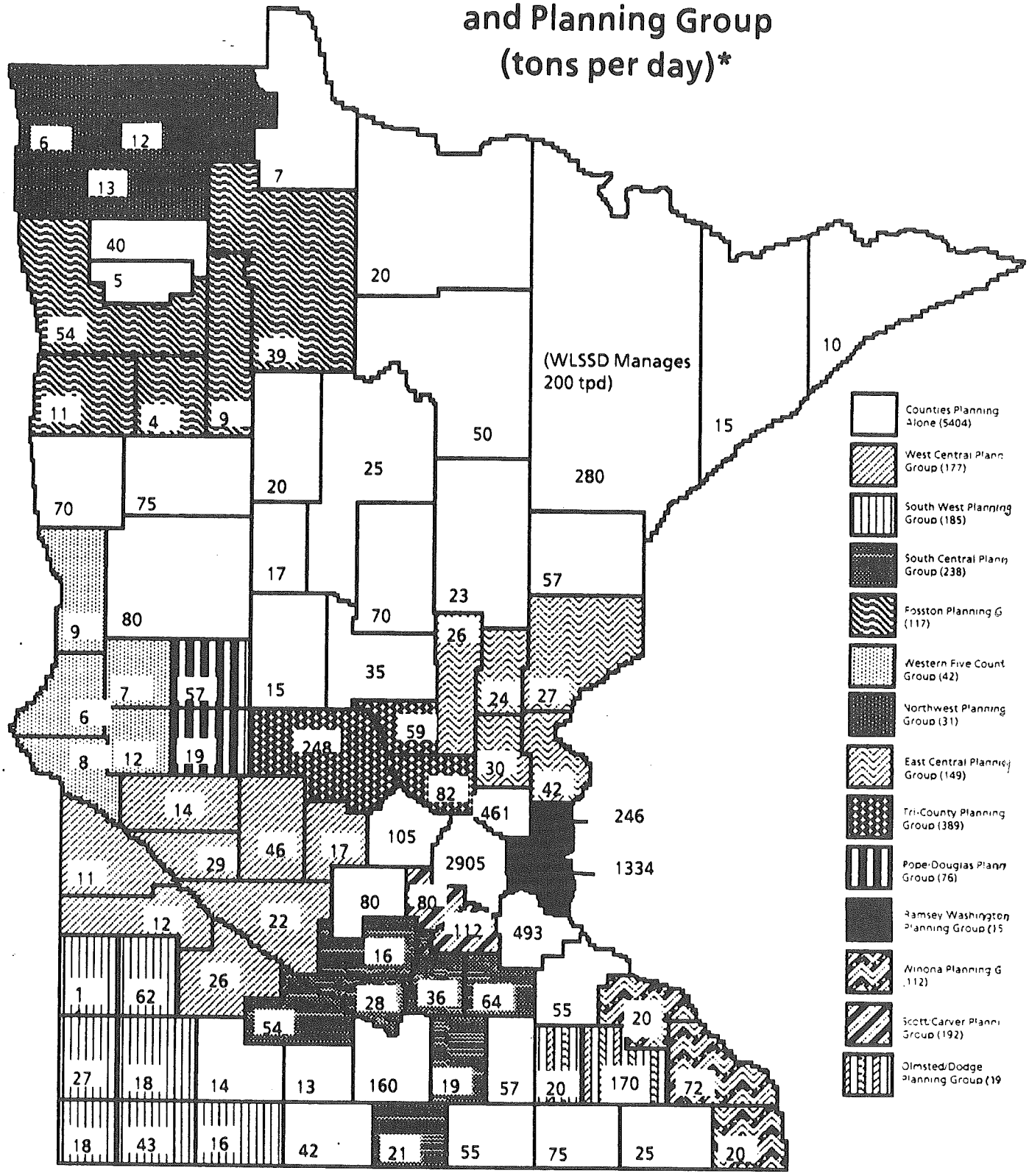
The composition of the waste stream is extremely important in terms of the environmental problems that might be caused by the management of a particular waste stream, and in determining the potential quantities available for various waste management technologies. Composition varies significantly by location characteristics (e.g., urban vs. rural) and seasonally. Because of the expense involved in doing accurate and careful composition studies, few have been done in Minnesota. The results of two recent studies are shown in Table V-2. Nationally, the most complete study has been done by Franklin Associates. This study includes historical trends and projections. The results of this study are shown in Table V-3.

Waste Generation Trends: Amount of Waste Generated

Many factors influence the amount of waste generated, including changes in population, the health of the economy, and the success

MAP V-1

Minnesota
Waste Volumes by County and Planning Group (tons per day)*



* Developed by MPCA staff in 1985/6 from a variety of data sources (e.g. county plans).

Total tonnage for each planning group is shown in parenthesis

December 28, 1987

SWC/PR/ExS

TABLE V-1
TOTAL SOLID WASTE GENERATION ESTIMATES
GREATER MINNESOTA/METROPOLITAN AREA

	MPCA LANDFILL (1986) REPORTS*	COUNTY ESTIMATES MPCA SOLID WASTE PLAN STATUS 3/5/87 (1985/86 data)	MPCA-COST ESTIMATING MODEL FOR A CONTINGENCY ACTION FUND* (1986)
Greater Minnesota	tons/day-3079 tons/yr.- 1,123,943	tons/day-3273 tons/yr.- 1,004,845	tons/day - 3992 tons/yr. - 1,457,041
Metropolitan Area	tons/day- 5329 tons/yr.- 1,944,933	tons/day - 5631 tons/yr - 2,055,315	tons/day-5236 tons/yr. - 1,911,145
TOTAL	tons/day - 8408 tons/yr. 3,068,876	tons/day - 8904 tons/yr. 3,249,960	tons/day - 9228 tons/yr. - 3,368,186

* Figures reported as cubic yards per year. Converted to tons using 1 ton = 3.333 cu. yds. For daily tonnage a 365 day year is used.

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TABLE V-2

THREE MINNESOTA WASTE SORT COMPOSITION STUDIES
(Reported as percentages)

MATERIAL	Red Wing* May	Red Wing* Sept.	Hennepin County** Summer	Hennepin County** Fall	Ramsey/ Washington Counties***
Newspaper	7.5	7.9	6.04	6.33	6.5
Corrugated	14.7	17.1	9.06	12.09	17.4
Mixed Paper	19.2	20.9	14.47	14.17	17.3
Ferrous	5.4	2.9	4.99	4.82	3.4
Aluminum	1.1	1.0	.61	1.10	.9
Other non-Ferrous			.12	.18	.3
Plastic	7.9	12.5			10.0
Food Waste	10.6	13.9			6.8
Glass	5.7	5.0	4.09	3.06	3.6
Yard Waste	11.2	3.2	8.74	15.45	11.8
Wood	5.1	6.7	9.73	5.47	6.2
Other Combustibles	9.2	7.6			
Other Non-Combustibles	2.4	1.3			
Other Organics			33.46	32.16	6.8
Other Inorganics			8.69	5.17	2.6

*1986 Red Wing averaged residential/commercial, industrial and self haul deliveries to the Red Wing Incinerator. Separate averages are reported for sorts done in May and September.

**1985 Hennepin County Comprehesive Recycling Study, Pope-Reid. Data combined residential and commercial/industrial waste streams. Separate averages are reported for sorts done in the summer and fall of 1984.

***1988 Draft Report-Waste Generation and Composition Study, Cal Recovery Systems, Inc. A one season waste sort of waste arriving at the Ramsey/Washington Central Processing Facility in Newport, MN. (Industrial Waste loads which contain large amounts of unprocessible waste bypass this facility.)

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Table V-3

MATERIALS DISCARDED INTO THE MUNICIPAL WASTE STREAM, 1960 TO 2000
(In percent of total discards by weight)

Materials	1960	1965	1970	1975	1980	1981	1982	1983	1984	1990	1995	2000
Paper and Paperboard	32.1	35.0	33.1	30.4	33.6	34.5	33.2	35.3	37.1	38.3	39.7	41.0
Glass	8.4	9.2	11.3	11.6	11.3	11.3	11.0	10.4	9.7	8.8	8.1	7.6
Metals												
Ferrous	13.0	10.9	11.2	10.6	8.9	8.7	8.8	8.5	8.3	7.8	7.4	7.1
Aluminum	0.4	0.5	0.7	0.9	1.1	1.0	1.1	1.2	1.1	1.4	1.5	1.7
Other Nonferrous	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Plastics	0.5	1.5	2.7	3.9	6.0	6.1	6.7	7.0	7.2	8.3	9.1	9.8
Rubber and Leather	2.2	2.4	2.7	3.3	3.3	3.2	3.0	2.6	2.5	2.5	2.5	2.4
Textiles	2.6	2.4	2.0	2.2	2.3	2.4	2.4	2.3	2.1	2.2	2.2	2.2
Woods	3.9	3.8	3.6	3.8	3.9	3.5	4.0	4.0	3.8	3.7	3.8	3.8
Other	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL NONFOOD PRODUCT WASTES	63.4	65.9	67.8	67.0	70.8	71.1	70.6	71.6	72.2	73.3	74.7	75.9
Food Wastes	14.6	13.1	11.5	11.8	9.2	8.9	8.8	8.5	8.1	7.7	7.3	6.8
Yards Wastes	20.3	19.2	19.0	19.5	18.2	18.2	18.7	18.1	17.9	17.0	16.1	15.3
Miscellaneous Inorganic Wastes	1.7	1.7	1.6	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.9	2.0
TOTAL WASTES DISCARDED*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
ENERGY RECOVERY**	0.0	0.2	0.4	0.6	2.1	1.8	2.8	3.8	4.9	9.4	15.0	20.2
NET WASTES DISCARDED	100.0	99.8	99.6	99.4	97.9	98.2	97.2	96.2	95.1	90.6	85.0	79.8

* Wastes discarded after materials recovery has taken place.
** Municipal solid waste consumed for energy recovery. Residues from these facilities are discussed in Chapter 2.

Details may not add to totals due to rounding.
Source: Franklin Associates, Ltd.

WP/SW/PROF.XS

of waste reduction and education efforts. On a per capita basis the general trend reported in national studies is toward a steady increase in the amount of waste generated by each individual. For example, Franklin Associates' report to the EPA, Characterization of Municipal Solid Waste in the United States, 1960 to 2000 (Update 1988), predicts an increase from 3.5 pounds per person per day (ppd) in 1985 to approximately 3.9 ppd in the year 2000. The Minnesota state demographer predicts an approximate 10 per cent increase in the State's population during those years, but the increase in waste generation per capita would produce about 22 per cent more waste. A 22 per cent increase in the estimated 3.3 million tons per year produced in 1986 (MPCA Cost Estimating Model for a Contingency Action Fund) would yield almost 2000 tons per day of additional waste to be managed by the year 2000.

This projected increase in per capita generation was not factored into Minnesota waste generation estimates used by the MPCA in its Cost Estimating Model for a Contingency Action Fund (1986). Rather, projections were based on the assumptions that "waste reduction achieved will remain at roughly 3 per cent of the waste stream, and after 1991 it is assumed that waste generation will increase along with the population increase at about 0.3 per cent per year." Thus, the projected increase in generation from 9228 tons per day (tpd) in 1986 to 9342 tpd in 1995 might be assumed to be a low estimate.

Waste Generation Trends: Composition

Expected trends in waste stream composition are also of great importance in planning for future program and facility needs. Again, a number of factors must be considered when predicting composition, with the amount and type of commercial and industrial activity in a given area being among the most influential. In addition, the type and extent of solid waste processing technologies implemented will greatly influence the types of waste eventually going to land disposal facilities. In Minnesota, the development of waste-to-energy technologies will mean that incinerator ash will be a significant component of waste disposed in the future. At the national level, Franklin Associates is an often quoted source of information on predicted waste composition trends. (See Table V-3)

The most recent effort to predict waste composition trends in Minnesota is found in the September 1988 Draft Report: Waste Generation and Composition Study prepared for the Metropolitan Council by Cal Recovery Systems, Inc. The Study did a one-season waste sort at the Ramsey/Washington Counties RDF facility to determine the composition of the waste received (see Table V-2), studied historical national trends in the production of manufactured goods, and predicted future waste composition based on two assumptions. The assumptions were that consumption

patterns in the Metropolitan Area would be the same as national consumption patterns and that disposal rates for materials were linked to production rates for those materials (the latter assumption based on methodology similar to that used by Franklin Associates).

The Cal Recovery study noted a national increase in paper production (thus disposal) over the past decade and found paper to comprise 46.5 per cent of the waste stream delivered to the Ramsey/Washington facility. Both Cal Recovery and Franklin Associates predict that the percentage of paper in the waste stream will continue to increase through the year 2000.

Cal Recovery reported that glass comprised 3.6 per cent of waste discarded, with actual glass consumption somewhat greater assuming that a portion of the glass consumed is recycled. Cal Recovery noted an increase of 3.9 per cent in gross shipments of container glass between 1984 and 1987, due mainly to an increased use of glass wine containers. However, the report also noted a "major shift from glass to metal containers," and analysts' expectations that production of other container materials will out-distance glass. Because approximately 81 per cent of glass consumed is composed of food and beverage glass, the percentage of glass in the waste stream is expected to decline as aluminum and plastics increase their market share of food and beverage industry packaging. Franklin predicts a national decline in glass discards from 7.6 per cent of the waste stream in 1986 to 6.4 per cent of the waste stream by the year 2000, with the actual tonnage of glass produced remaining relatively flat.

Shipments of steel and bi-metal cans were also reported to be declining. Cal Recovery stated, however, that shipments of aluminum cans experienced high annual growth rates. Franklin Associates reported the same findings, noting that in spite of significant growth, aluminum cans will still represent less than one percent of the waste stream in the year 2000 because of their light weight.

Plastics were approximately 10 per cent of the total waste stream in Cal Recovery's report, which stated that between 1984 and 1986, national consumption of plastics increased by 26.5 per cent. By the year 2000, the report projects that plastics will comprise 15.2 per cent of the total waste stream.

In summary, while projections of waste quantities and composition are important for planning and program development, it must be kept in mind that any projections made depend on key assumptions about factors such as consumer and producer behavior, technological developments, and solid waste policies. Unanticipated changes in such factors could cause substantial changes in the waste stream.

CHAPTER VI: COLLECTION AND TRANSPORTATION

Introduction

Minn. Stat. ch. 400 grants counties and local units of government the authority to regulate transportation and collection of municipal solid waste. In most cases, cities within a county provide, manage, or regulate transportation and collection. There are no state policies that mandate transportation and collection responsibilities.

Collection and transportation issues are important considerations in optimizing the entire solid waste management system. As recycling and other processing facilities are integrated with land disposal and waste-to-energy facilities, the transportation system must reflect the changes needed when departure occurs from one point of disposal to many points of processing and disposal. Just as an integrated solid waste management system includes waste reduction, recycling, composting, waste-to-energy, and land disposal, the collection and transportation systems must consider the time and cost efficiency of collecting the individual waste streams (e.g., household hazardous waste, recyclable, yard waste) separately or in subgroups.

Issues directly related to the collection and transportation systems include:

* Government versus private-sector service;
* Finance methods;
* Waste control; and
* Intermediate collection points.

Each issue is complicated because of the internal conflict within the issue and the interrelationship between issues. However, the understanding of each issue is critical to the optimization of the entire solid waste management system.

Collection System Options

Waste collection arrangements can be categorized as either private or municipal. An organized collection system is a combination of the private and municipal systems under which the private collector is authorized to collect waste in a geographic area as defined by the municipality. The other forms are self-explanatory.

The private collection system embraces the ideals of free enterprise and minimizes local government regulation. Local government regulation may be limited to quality control under

this system. Individuals would have the right to choose between the services offered by different haulers. Costs may be lower to individual users because of the competition between haulers but the overall system costs may be higher because several haulers will be serving one neighborhood.

The municipal collection system allows for better monitoring by the local unit of government. Direct decision making authority may make the governmental unit more responsive to the needs of its citizens. Cost may be reduced under this system as profit motives are removed.

Organized collection is a system that tries to maximize the efficiency of both the private and municipal collection system. Private haulers are used while municipalities finance the collection. The municipality establishes collection areas to be bid for by haulers. A contract is then drawn up between the municipality and hauler. With municipal financing, costs can be controlled for the term of the contract. The costs experienced by individual households should be lessened by the contract process and the more efficient collection process permitted under organized collection. The Metropolitan Council's 1985 study on organized collection concluded that it was the most economical system for these reasons. Table VI-1 shows Refuse Collection Practices by Population Size and was prepared by the Office of Local Government Survey, 1983.

The issue of government versus private sector service is often dependent on local budget constraints. Waste collection, like public water supply and wastewater treatment, is an essential service for public health protection, and therefore often considered a function of municipal governments. However, the more important issue is whether this option is the most efficient and cost-effective.

Waste Stream Control Measures

The collection and transportation system is affected by the preferred solid waste management option for an area. The financial stability of a management option may depend on a guaranteed supply of waste. In this case, waste stream controls would be utilized. The controls may influence where, when and how the waste is collected and transported to the selected facility. Thus, local government involvement will be critical in choosing the solid waste management option for the area and the means needed to ensure the viability of the option either through direct financial support or operation of the facility, or by ensuring that sufficient waste is delivered to the facility.

The concept of developing more efficient and economical transportation and collection systems can be expanded to larger areas or regions. These "waste sheds" should be identified as

TABLE V1-1
REFUSE COLLECTION PRACTICES BY POPULATION SIZE
1983 OFFICE OF LOCAL GOVERNMENT SURVEY

Population Category	Response Rate	Collection System Type		
		Private	Contract	Municipal
100,000-499,999	2/2 (100%)	1 (50%)		1* (50%)
50,000-99,999	2/3 (67%)	2 (100%)		
25,000-49,999	15/16 (94%)	11 (73%)	3 (20%)	1 (7%)
10,000-24,999	30/42 (71%)	19 (63%)	5 (17%)	6 (20%)
5,000-9,999	31/40 (78%)	21 (68%)	8 (26%)	2 (6%)
2,000-4,999	92/104 (88%)	50 (54%)	27 (29%)	15 (16%)
Total**	176/207 (85%)	107 (61%)	44 (25%)	25 (14%)

*Minneapolis is included as a municipal system, but in fact divides refuse collection between municipal and contract delivery.

**Four respondents did not identify themselves. They are included in the total, but not in the breakdown by population.

part of the planning effort to avoid inefficient and duplicate efforts by haulers, private enterprise, and local government.

Waste streams controls can be directly or indirectly applied. Direct controls include designation by ordinance or contract and indirect controls include financial subsidies, surcharges, or government control of management options. As with the management option, waste stream controls have their advantages and disadvantages. Each option must be weighed against each other and the entire management system needs.

Waste control through ordinances is often called flow control or waste designation. Flow control can also be achieved through licensing procedures, creation of waste management districts and state law. The Waste Management Act authorizes flow control activities to assist in implementing waste processing facilities. Flow control cannot, however, be used to guarantee a waste supply to a recycling center or a land disposal facility. Although it is sometimes considered a complicated process, flow control allows competition among waste collectors and retains the incentive for cost control and efficient collection service. Service areas that have implemented flow control should be evaluated to determine if the process provides the authority needed to effectively control the waste stream. The issue of designating waste to land disposal facilities should also be studied.

Two basic contract situations exist; contracts between the facility owner and the waste haulers and contracts between the facility owner and the service area municipalities. Unlike flow control mechanisms, contracts are formed by mutual agreement reached through negotiation. Contracts between the facility owner and the individual waste haulers maintain competition and are more easily implemented in communities with organized collection. The disadvantages with this type of contract include haulers choosing the cheapest management option, not necessarily the preferred option. Also, facility owners may have some difficulty in administering a large number of contracts, and the waste assurance may be temporary as contracts do expire and haulers may go out of business before the contract expires.

The second type of contract, between facility owner and the governing body of a particular service area, requires the governing body to implement some form of waste control. Because the governing body is guaranteeing the facility owner a volume of waste, assurance is needed that the waste will be available. The governing body has more control over solid waste management under this system than would exist if the contract were between the facility owner and waste haulers.

An indirect control on waste streams is through financial assistance to the owner of a particular management option.

Financial assistance reduces tipping fees associated with the management options, making it preferable to other available options. However, the amount of financial assistance available may be limited due to governmental budgets.

Another form of indirect control is through the use of surcharges. Surcharges, like financial assistance, are used to affect the cost differentials that may exist between management options. Surcharges allow the competition for collection service contracts to continue. Surcharges, even more importantly, may be used to fund other management options like waste abatement and recycling.

Governments can control waste management by owning facilities and then either operating the facility or leasing out facility operations. Governments can also control management options through siting, design and operational standards. Governmental control of facilities, in effect, places surcharges on particular management options and thus, produces economic incentives to utilize a particular management system.

The preceding discussion contains a number of waste control measures that may be used to control the collection and transportation of solid waste within a particular management scheme. The existing collection system may limit, to some extent, the success of some waste stream control measures. The dynamics of collection systems are such that the controls of the system should remain with local levels of government.

Transfer Stations

With the integration of solid waste management options, the use of transfer facilities has increased. A transfer facility is used to collect small amounts of waste into large, economically - transported volumes. Early transfer facilities were used to simply aggregate waste volumes. Recent facilities are also used as pre-processing facilities to segregate the waste stream (e.g., recyclables, demolition debris, household hazardous waste, waste tires). Although the functions and capabilities of transfer facilities may change, their main function as a waste assurance measure will expand.

There are 16 transfer facilities in Minnesota. Many of these facilities were originally intended to deliver waste to land disposal facilities. With recent changes in waste management, 75 percent of these transfer facilities are now or will be transporting waste to processing facilities. By 1989, at least eight more transfer facilities are expected to be under construction or on-line. Table VI-2 provides a list of transfer facilities and the intended destination for the waste.

TABLE VI-2

Existing/Proposed Transfer Facilities

Facility	County	Existing Waste Destination
Austin	Mower	Land Disposal
Bellair	Washington	NSP-Newport RDF
Fall Lake Township	Lake	Land Disposal
Fillmore County	Fillmore	Land Disposal
MCS Refuse, Incorporated	Anoka	Elk River RDF
Minneapolis North Side	Hennepin	Minneapolis Incinerator
Poor Richard's Recycling and Transfer	Ramsey	NSP-Newport RDF
Mission Township	Crow Wing	Crow Wing County Compost
Moorhead	Clay	Land Disposal
Richard Sanitation	Houston	Winona Incinerator
Roosevelt Township	Crow Wing	Crow Wing County Compost
St. Cloud	Benton	Elk River RDF/Tri-County Compost
Henning	Otter Tail	Perham Incinerator
Detroit Lakes	Becker	Perham Incinerator
Mantorville	Dodge	Olmsted Incinerator
Park Rapids	Hubbard	Fergus Falls Incinerator
Guthrie	Hubbard	Fergus Falls Incinerator
Bemidji	Beltrami	Polk County Incinerator
Morris	Stevens	Fergus Falls Incinerator
Carlton County North	Carlton	WLSSD Incinerator

WP/SW/PR ES/Table VI-2-ExS-BJ:eh

Volume-Based Pricing

The current system for financing collection and transportation costs includes taxes, gate fees, surcharges and volume-based pricing. The most effective system for recycling facilities utilizes the homeowner or commercial establishment to separate the recyclable from non-recyclable. A user paying a standard fee, independent of the amount of waste put out for pick-up, is not encouraged to separate their waste or reduce the amount of waste generated. Economic incentives along with ease of participation (free containers, same day pick-up as other waste) have shown to increase the amount of recycling conducted. Volume-based pricing also serves to reflect the true cost of collection, transportation, processing and disposal; however, the economic incentive needs be to considerable for volume-based pricing to be effective. Problems with volume-based pricing include lack of available collection and methods to accurately determine the amount of waste collected. In addition, there is the danger that as the costs of managing solid waste are increased to the individual, problems of illegal disposal (e.g. along roadsides, rivers, and streams) could increase. Several innovative systems have been implemented in Minnesota. These programs should be monitored so that information can be gathered and technical assistance materials developed.

Table VI-3 shows the proposed rate structure for Seattle, Washington for 1989-90. The proposed rate changes were designed to increase recycling. Table VI-4 shows the variable structure for St. Louis Park, Minnesota. This structure was implemented by the city in January 1988.

TABLE VI-3
PROPOSED RATE STRUCTURES: SEATTLE 1989/1990

Curbside/Alley # of Cans	Rate	Backyard # of Cans	Rate
Mini	$10.45	1	$16.35
1	$13.55	2	$27.20
2	$22.55	3	$38.05
3	$31.55	4	$48.90
4	$40.55		

TABLE VI-4
VARIABLE RATE STRUCTURE:
ST. LOUIS PARK

Service Type	Monthly Customer Service Charge 1987	1988	Increase (Decrease)
Non-recycler w/no lawn materials	$ 6.75	$ 8.80	$ 2.05
Non-recycler w/lawn materials	6.75	11.80	5.05
Recycles w/lawn materials	6.75	9.60	2.85
Recycles w/no lawn materials	6.75	6.60	(.15)

CHAPTER VII: SYSTEM COSTS

Introduction

The task of estimating overall costs of solid waste management for the state, or even for a given area of the state, is a very complex and difficult process. There are a number of different components to such costs, including the direct costs of managing the wastes (i.e., collection, some form of processing if applicable, transportation, and final disposal) as well as indirect costs such as planning, regulation, waste education, and remedial action. The "mix" of these costs and the method of financing them, as well as the relative roles of the private and public sectors, vary significantly from area to area. In addition, there are different sectors generating wastes, including residential, commercial, industrial and institutional. Cost information in this chapter focuses on the residential sector.

Another major problem in determining cost information is that all existing sources of data are partial or incomplete. Most of the summary data collected on costs comes from studies done in the Metropolitan Area. For Greater Minnesota, data from county plans is useful, but is only partial and is not reported in a way which allows easy comparison between counties or aggregation to total statewide figures.

Available Cost Data

Two studies done in the Metropolitan Area provide good information about management costs in that region. Preliminary 1988 data for the Metropolitan Council's Policy Plan report the total cost (including collection and transportation) of landfilling residential waste at $119 a ton; costs for resource recovery were estimated at $124-$153 per ton, and for recycling at $45.50 per ton. The recycling cost estimate does not include consideration of the savings in disposal costs, but does subtract expected revenue from the sale of recycled materials. Another study, done by the Minneapolis Department of Public Works, estimated the costs of collection and disposal in 1986 to be approximately $80 per ton. Table VII-1 shows the Metropolitan Council's preliminary cost analysis for 1988.

A major source of data on costs in Greater Minnesota is the county plans. While these plans contain a great deal of cost information useful to counties in developing their strategies, the presentation of the data does not, in general, lend itself to comparisons between counties or to aggregation into statewide data. Analysis of ten recently approved county plans which did contain comparable numbers shows an average predicted management

Table VII-1

Metropolitan Council Preliminary
Cost Analysis for 1988

Waste Management Cost Summary

Landfilling

	Residential	Commercial/Industrial
Collection	$77.00/ton	$27.00/ton
Transportation	$13.00/ton	$12.00/ton
Disposal	$29.00/ton	$29.00/ton
TOTAL COST	$119.00/ton	$68.00/ton

Resource Recovery

	Residential	Commercial/Industrial
Collection	$77.00/ton	$27.00/ton
Transportation	$10.00/ton	$9.00/ton
(transfer cost)	$10.00/ton	$10.00/ton
Dispoal	$37.00 - $56.00/ton	$37.00 - $56.00/ton
TOTAL COST	$124.00 - $153.00/ton	$73.00 - $102.00/ton

Recycling

	Residential	Commercial/Industrial
Collection	$49.00/ton	$27.00/ton
Transportation	$21.00/ton	$12.00/ton
Marketing and Prep	$22.50/ton	$12.00/ton
Value of Materials	($47.00/ton average)	($47.00/ton average)
TOTAL COST	$45.50/ton	$4.00/ton

The recycling information is based on the following materials aluminum, glass, newspaper, cardboard, ferrous metals, and high grade office paper.

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cost per ton over the next ten years for current waste systems to be in a range of about $17 per ton to $42 per ton. (See, Table VII-2). These figures do not include collection and transportation costs.

To provide further information on solid waste costs, a survey was distributed to all of the counties in Greater Minnesota requesting information on their county solid waste budgets and on the commitment of staff to solid waste at the county level. By early July, 1988, 46 counties had responded to the survey. The results show a large variation in amounts being spent by counties for solid waste management. This variation is due to different budgeting methods, differing roles of public and private sector, and to the fact that counties are in widely different stages of program planning and implementation. In terms of staff commitments, 33 of the 46 counties responding had one or more full time equivalent staff working on solid waste. (See, Table VII-3).

The county survey also sought information on collection and disposal costs around the state. Again, costs varied widely with the low being $3-$5 per month compared with a high estimate of $26.50 per month. In general, rural collection rates were somewhat higher than "in-town" service. (See, Table VII-4). For rural collection services, a high of $42 per month was reported. A separate survey was done in February of 1988 of tipping fees at waste disposal facilities around the state. Estimates ranged from $1.75 per cubic yard to $8.50 per cubic yard ($5.80-$28.30 per ton). Of the 58 counties responding, six charged no tipping fee. A March 1988 survey of Metropolitan Area landfills showed a range of $6 per cubic yard to $13 per cubic yard ($20-$43.30 per ton). Table VII-5 shows the tipping fees and surcharges at Greater Minnesota waste facilities (waste to energy and land disposal facilities). Table VII-6 shows the tipping fees and surcharges at Metropolitan Area land disposal facilities.

Based on extrapolations from the Minneapolis study and the county plan data, it can be estimated that solid waste management costs in Greater Minnesota (in terms of residential collection, transportation, and disposal) are approximately $50 per person per year. This figure, however, must be viewed with great reservation because of the imprecision of the data on which it is based and on the great variation in costs from area to area. This figure was derived by assuming that the cost of solid waste residential collection, transportation and disposal as reported by the Minneapolis Department of Public Works (MDPW) in 1986, $82.70 per ton, was applicable statewide. This amount was multiplied by the amount of waste disposed in Greater Minnesota in 1986, then divided by the population of Greater Minnesota in 1986 to yield an annual per capita cost of $48.70.

TABLE VII-2

SUMMARY OF TEN APPROVED COUNTY PLANS' ESTIMATED COSTS FOR EXISTING & PROPOSED SOLID WASTE DISPOSAL SYSTEMS

	Cost of Existing Solid Waste Management System					Cost of Proposed Solid Waste Management System[3] (Landfill Abatement)			
County	Total cost over 10 years	Annual Average Total cost[1] per person	Annual Average Total cost per household[2]	Average cost per ton		Total cost over 10 yr.	Average Total cost per person	Average Total cost per household[1]	Average cost per ton
Brown	$3,578,192.00	$12.60	$37.70	$16.68		$5,612,108.00	$19.70	$59.10	$26.17
Rice	7,537,550.00	15.50	47.90	19.79		14,642,619.00	30.10	93.10	38.44
Waseca	3,930,043.00	20.10	60.30	29.12		4,642,619.00	25.20	75.60	36.49
Sibley	1,141,847.00	7.40	22.20	18.28		2,148,279.00	13.90	41.70	34.40
Nicollet	3,325,229.00	11.60	34.70	18.39		6,241,451.00	21.70	65.10	34.51
LeSueur	2,536,940.00	10.40	31.10	18.37		4,786,214.00	19.60	58.70	34.67
Steele	4,049,932.00	* 12.40	37.10	18.43		5,292,349.00	16.20	48.50	24.09
Sherburne	12,804,400.00	* 27.00	84.75	32.32		17,770,587.00	37.21	116.83	44.48
Stearns	29,996,546.00	* 24.82	77.93	26.53		37,517,858.00	31.05	97.49	37.15
Benton	10,432,966.00	* 36.04	113.17	42.16		11,668,406.00	40.16	126.08	47.26

1 Tipping Fee only - does not include collection and transportation.
2 Assumes 3 people per household.
3 May include transportation costs for recycling and yard waste composting.
* Includes recycling and/or yard waste composting.

WP/SW/PR/Ex5

Table VII-3

Staff Assigned to Solid Waste Management in Greater Minnesota

County	Staff Assigned to Solid Waste Administration (FTE)*	County	Staff Assigned to Solid Waste Administration (FTE)*
Aitkin	1.0	Jackson	1.0
Becker	1.0	Kanabec	1.0
Beltrami	1.0	Kandiyohi	2.0
Benton[1]	1.0	Kittson[2]	
Big Stone	1.0	Koochiching	1.0
Blue Earth	.50	Lac Qui Parle	1.0
Brown	.25	Lake	.30
Carlton	3.0	Lake of the Woods	
Cass[1]		Le Sueur	1.0
Chippewa[1]		Lincoln	1.0
Chisago[1]		Mahnomen[1]	
Clay	1.5	Marshall	.25
Clearwater		Martin	1.0
Cook	1.0	McLeod[1]	
Cottonwood	1.0	Meeker[1]	
Crow Wing	2.0	Mille Lacs	1.0
Dodge[1]		Morrison	1.0
Douglas[1]		Mower[1]	
Faribault	.50	Murray[1]	
Fillmore[1]		Nicollet[1]	
Freeborn	2.0	Nobles	1.0
Goodhue[1]		Norman[1]	
Grant	1.0	Olmsted[1]	
Houston[1]		Ottertail	1.0
Hubbard	1.0	Pennington[1]	
Isanti	.30	Pine[1]	
Itasca	3.0	Pipestone[1]	

Data collected from 1988 survey of counties

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*FTE = Full time equivalent

1. County did not return survey
2. Did not answer question

Table VII-3

Staff Assigned to Solid Waste Management in Greater Minnesota

County	Staff Assigned to Solid Waste Administration (FTE)*	County	Staff Assigned to Solid Waste Administration (FTE)*
Polk[1]		Stevens	.25
Pope	.30	Swift[1]	
Red Lake	.10	Todd	1.0
Redwood[1]		Traverse	1.0
Renville	1.0	Wabasha	.20
Rice	1.0	Wadena	1.0
Rock	.30	Watonwan	.30
Roseau	.50	Waseca	.60
Sherburne[1]		Wilkin[1]	
Sibley[1]		Winona	9.0
St. Louis	4.0	Wright[1]	
Stearns[1]		Yellow Medicine	1.0
Steele	1.5		

Data collected from 1988 survey of counties WP/SW/PR/EXS/BJ:eh
*FTE = Full time equivalent
1. County did not return survey
2. Did not answer question

TABLE VII-4

Residential Collection in Greater Minnesota

County	Monthly range in town	Monthly range for rural areas	Estimate percentage of Population Served	Percentage of county without collection service		Estimate percentage who haul to landfill	Estimate percent who burn at home
				by area	by population		
Aitkin	$6-8	$7-9.50	-	c	c	10%	10%
Becker	$7-10	$8-12	15,000	30%	25%	10%	10%
Beltrami	$14	$2.00/bag	58%	60%	32%	10%	25%
Benton [b]							
Big Stone	$4-8	$7-12	6,000	25%	800-900	1%	25%
Blue Earth	$5 +	$5 +	-	60%	20%	20%	20%
Brown	$3.25-6.50	not known	81%	80%	20%	1%	19%
Carlton	$9-12	$11-15	20,000	5%	-	10%	10-15%
Cass [b]							
Chippewa [b]							
Chisago [b]							
Clay	$7-8	same	-			c	c
Clearwater [b]							
Cook	$10-14	c	2,000	90%	10%	10%	25-50%
Cottonwood	$5 +	$5 +	-	90%	25%	1%	25%
Crow Wing	$8-10	$10-13	86%	30%	10%	7%	5% +
Dodge	$8-16	$16-24	70%	30%	30%	10%	30%
Douglas [b]							
Fairbault	$3-5	not known	12,506	98.4%	36.6%	less than 15%	95%
Fillmore [b]							

TABLE VII-4

Residential Collection in Greater Minnesota

County	Monthly range in town	Monthly range for rural areas	Estimate percentage of Population Served	Percentage of county without collection service		Estimate percentage who haul to landfill	Estimate percent who burn at home
				by area:	by population		
Freeborn	$8	$11	c	0%	0%	5%	20%
Goodhue [b]							
Grant	$6-8	same	3,800	98%	35%	1%	15%
Houston [b]							
Hubbard	$3-8	$5-11	3,500	30%	c	60%	5%
Isanti	c	c	3,000	c	c	4%	4%
Itasca	$6-9	$8-12	100%	0%	0%	15%	10%
Jackson	$4.50-8	not known slightly higher	7,500	40%	3,500	50%	30%
Kanabec	$9 or 1.25 bag	same	-	10%	75%	c	c
Kandiyohi	$6-8.50	same	48,400	c	c	c	c
Kittson	$7	not known	-	25%	25%	25%	25%
Lac Qui Parle	c	c	-	c	c	0%	90%
Lake	$6.50-7.50	same	85%	10%	5%	15%	5%
Lake of the Woods [b]							
Le Sueur	c	c	c	c	c	[d] 53% (burn + transport to landfill)	[d] 16% (9% bury)
Lincoln	$6-7	not known	3,600	85%	45%	5% rural 45% town	30%

TABLE VII-4

Residential Collection in Greater Minnesota

County	Monthly range in town	Monthly range for rural areas	Estimate percentage of Population Served	Percentage of county without collection service		Estimate percentage who haul to landfill	Estimate percent who burn at home
				by area	by population		
Lyon [b]							
Mohnomen [b]							
Marshall	$26 +	$42 +	-	0%	0%	c	c
Martin	$3.50-8	same	-	c	40%	5%	25% (20% bury)
McLeod [b]							
Meeker [b]							
Mille Lacs	$8-15	$10-20	100%	0%	0%	c	c
Morrison	c	c	20,000	30%	30%	5%	30%
Mower [b]							
Murray [b]							
Nicollet [b]							
Nobles	$6	not known	c	80%	40%	10%	30%
Norman [b]							
Olmsted [b]							
Ottertail	c		54,000	0%	0%	c	c
Pennington [b]							
Pine [b]							
Pipestone [b]							
Polk [b]							

TABLE VII-4

Residential Collection in Greater Minnesota

County	Monthly range in town	Monthly range for rural areas	Estimate percentage of Population Served	Percentage of county without collection service		Estimate percentage who haul to landfill	Estimate percent who burn at home
				by area:	by population		
Pope	$6.50-9.50	not known	75%	30-40% +	20-25% +	very few	most of rural population
Red Lake	$6-12	$12-24	90%	25%	10%	0	20%
Redwood [b]							
Renville	$3-6	not known	10,000	80%	50%	1%	50%
Rice	$10-12	20% higher	41,000	5%	5%	5%	5%
Rock	not known	not known	-	80%	50%	30%	unknown
Roseau	$7.50	$8.50-9.50	-	not known	less than 5%	c	30%
Sherburne [b]							
Sibley [b]							
St. Louis	not known	not known	not known	50%	10%	30%	not known
Stearns [b]							
Steele	$4-8	same	70%	85%	30%	10%	20%
Stevens	$5	same	-	c	c	c	c
Swift [b]							
Todd	$7.50-10.50	5-50% higher	12,000	65%	40%	1%	50%
Traverse	$8	not available	-	90%	2,000	65%	35%
Wabasha	not known	not known	-	c	c	c	c
Wadena	$7 50 10 00	$9 50-12	70%	35%	30%	0%	30%

TABLE VII-4

Residential Collection in Greater Minnesota

County	Monthly range in town	Monthly range for rural areas	Estimate percentage of Population Served	Percentage of county without collection service		Estimate percentage who haul to landfill	Estimate percent who burn at home
				by area:	by population		
Waseca	c	c	18,000	95%	25%	10%	15%
Watonwan	$5 +	$5 +	80%	80%	20%	30%	10%
Wilkin [b]							
Winona	$10-12	same	40,000	0%	0%	less than 5%	5-7%
Wright [b]							
Yellow Medicine	$5.50-9	same	6,100	96%	47%	4%	43%

a. Compiled from survey sent to Solid Waste Officers for 80 Greater Minnesota Counties in February 1988.
b. Did not return survey.
c. Did not respond to question.
d. County had its own survey of rural residents attached. 93% of rural residents did not use collection services.

WP/SW/PR/Costs:dc

TABLE VII-5

GREATER MINNESOTA

WASTE DISPOSAL FACILITY TIP FEES

County	Facility	Tip Fee	Surcharge
Aitkin	SW-145	$3.75.cu.-yd.[ab]	Proposed[a]
	SW-150	$3.75/cu.-yd.[b]	fee not listed
Becker	Transfer Station	$2.25/cu. yd.[ad]	$2.00/cu.-yd.[a] $25/residence[b]
Beltrami	Demonition Landfill Transfer Station	$4.00/cu. yd. $60/ton	None
Benton*			
Big Stone	Sanitary Landfill	$8/cu. -yd[a] $5/cu.-yd.[bd]	none[a] $3/cu.-yd.[b]
Blue Earth	Ponderosa Sanitary Landfill	$4.00/cu.-yd.[a]	$1.50/cu.-yd. (eff. 7/1/88)
	Brielmaier Demolition Landfill	varies[a]	58% of gate charge[a]
Brown County	Brown County Landfill	$2.55/cu.-yd.[af]	$1.70/cu.-yd.[a]
Carlton County	North Carlton County Transfer Station/Landfill	$25.75/ton[ae] $8.58/cu.-yd.[bc]	$20,000/-yr.[ab]
	South Carlton County Landfill	$7.10/cu.-yd.[abc]	$7,000/yr.[ab]
Cass*			
Chippewa		$5/cu.-yd.[b]	
Chisago*			

SOURCE:
a. Policy Report survey mailed to solid waste officers of all 80 greater Minnesota counties in February of 1988;
b. MPCA informal telephone and in-person survy of a land disposal facility owners/operators, February, 1988;
c. Surcharge included;
d. Surcharge not included;
e. May or may not include surcharge;
f. The unit of measurement was not specified and is assumed here;
*. Did not respond to Policy Report survey.

WP/PR/COST

TABLE VII-5

GREATER MINNESOTA

WASTE DISPOSAL FACILITY TIP FEES

County	Facility	Tip Fee	Surcharge
Clay	Clay County Landfill	$6/cu.-yd.[a]	none[a]
Clearwater*			
Cook	Cook County Sanitary Landfill	$8.50/cu.-yd.[ab]	none[ab]
Cottonwood	Cottonwood County Landfill	$12/ton[a] $3.50/cu.-yd.[b]	none[ab]
Crow Wing	Crow Wing County Landfill (SLF-111)	$2.50/cu.-yd[aef]	$1.25/cu.yd.[af]
Dodge	Dodge Co. Transfer Station	$59/ton[ae]	$10/ton[a]
Douglas*			
Faribault	Faribault County Sanitary Landfill, Inc.	$20.50/ton[ae]	$2.50/ton[a]
Fillmore*			
Freeborn	Landfill	$10/ton[a]	none[a]
Goodhue*			
Grant	Fergus Falls Incinerator	$20/ton[a]	
Houston*			
Hubbbard	2 Transfer Stations Demolition Landfill	no charge for residents; $10/cu.yd. (compacted) others[a] $3.33/cu.yd.[b]	none[a] none[b]

SOURCE: a. Policy Report survey mailed to solid waste officers of all 80 greater Minnesota counties in February of 1988;

b. MPCA informal telephone and in-person survy of a land disposal facility owners/operators, February, 1988;

c. Surcharge included;

d. Surcharge not included;

e. May or may not include surcharge;

f. The unit of measurement was not specified and is assumed here;

*. Did not respond to Policy Report survey.

Table VII-5

GREATER MINNESOTA

WASTE DISPOSAL FACILITY TIP FEES

County	Facility	Tip Fee	Surcharge
Isanti	Chisago-Isanti Landfill	$8/cu.yd.[ac]	Included in tip fee
Itasca	13 Canister Transfer Stations	no fee[a]	none[a]
	2 canister transfer stations and demo sites	demo: $2/yd.; white goods: $2; tires: $1 or $2; $1 minimum[a]	
	Landfill	Property tax[b]	none[b]
Jackson	Jackson County Landfill	$3.75/cu.yd. (compacted)[a] $1.75/cu.yd. (loose)[a] $3.50/cu.-yd.[b]	none[ab]
Kanabec			Cost not standardized yet[a]
Kandiyohi	Landfill	$5/cu.yd. (resident)[a] $11/cu.yd. (nonresident)[a] $3.50/cu.-yd.[b]	
Kittson	Anderson Sanitary Landfill	$2.67/cu.-yd.[b]	$24/residence;[b] $120/business[b]
Koochiching	Landfills	none[a] property tax[b]	none[a]
Lac Qui Parle	No facilities		

SOURCE:
a. Policy Report survey mailed to solid waste officers of all 80 greater Minnesota counties in February of 1988;
b. MPCA informal telephone and in-person survy of a land disposal facility owners/operators, February, 1988;
c. Surcharge included;
d. Surcharge not included;
e. May or may not include surcharge;
f. The unit of measurement was not specified and is assumed here;
*. Did not respond to Policy Report survey.

Table VII-5

GREATER MINNESOTA

WASTE DISPOSAL FACILITY TIP FEES

County	Facility	Tip Fee	Surcharge
Lake	Castle Danger Sanitary Landfill	No charge--resident; a $20/ton--non-resident;[a] property tax[b]	none[ab]
Lake of the Woods		$6/cu.-yd.[aef]	none[b]
Le Sueur	Tellijohn SLF Reak SLF	$5.25/cu.pd.[aef] No fee for own truck; $5/pick-up[ae]	$.75/cu.yd.[af] $.75/cu.yd.[af]
Lincoln	Demolition Site	$3/cu.yd.[af]	none
Lyon		$3.25/cu.yd.[bd]	$1.50/cu.yd.[b]
Mahnonen*			
Marshall	not applicable		
Martin	no facilities		
McLeod		$4/cu.yd.[bd]	$3/cu.yd.[b]
Meeker		$4/cu.yd.[b]	none[b]
Mille Lacs	no facilities		
Morrison	no facilities		
Mower*			
Murray		$2.25/cu.yd.[bd]	$.25/cu.yd.[b]
Nicollet*			

SOURCE:
a. Policy Report survey mailed to solid waste officers of all 80 greater Minnesota counties in February of 1988;
b. MPCA informal telephone and in-person survy of a land disposal facility owners/operators, February, 1988;
c. Surcharge included;
d. Surcharge not included;
e. May or may not include surcharge;
f. The unit of measurement was not specified and is assumed here;
*. Did not respond to Policy Report survey.

Table VII-5

GREATER MINNESOTA

WASTE DISPOSAL FACILITY TIP FEES

County	Facility	Tip Fee	Surcharge
Nobles	John Schapp Landfill	$12/ton (approx.)[a] $3.50/cu.yd.[b]	none
Norman*			
Olmsted*			
Ottertail	Perham Quadrant (incinerator)	$19.50/ton[a]	none
	Fergus Falls Incinerator	$19.50/ton[a]	none
	N.E Landfill	$19.50/ton[a]$19.50/ton[a] $5.90/cu.yd.[b]	none; service fee,[a] $25 per residence[b]
	Fergus Landfill	$19.50/ton[a] $5.90/cu.yd.[b]	none; service fee,[a] $25/residence[b]
Pennington*			
Pine*			
Pipestone		$3.50/cu.yd.[bc]	10% of total revenue
Polk	Polk County Incineration	$45/ton	Service fee, $80/per resident
Pope	no facility		
Red Lake	no facility		
Rewood		$2.50/cu.yd.[b]	
Renville	Renville County Landfill	$14/capita (in cities)[a] $16/capita[b]	
Rice	Rice County Landfill	$18.50/ton[a]	none
Rock	Rock County Sanitary Landfill	none[a] (property tax)[a]	none[a]

SOURCE:
a. Policy Report survey mailed to solid waste officers of all 80 greater Minnesota counties in February of 1988;
b. MPCA informal telephone and in-person survy of a land disposal facility owners/operators, February, 1988;
c. Surcharge included;
d. Surcharge not included;
e. May or may not include surcharge;
f. The unit of measurement was not specified and is assumed here;
*. Did not respond to Policy Report survey.

Table VII-5

GREATER MINNESOTA

WASTE DISPOSAL FACILITY TIP FEES

County	Facility	Tip Fee	Surcharge
Roseau	Roseau County Landfill	$4.50/cu.yd.[a]	none[a]
St. Louis	All St. Louis County Landfills; WLSSD	none[a]; property tax[b] $17.75/ton[a]	none[ab] none[a]
Sherburne*			
Sibley*			
Stearns			
Steele	Steele County Landfill	$6/cu.yd.(compacted) $4/cu.yd. (demolition)[a]	none[a]
Stevens	Landfill	$2/cu.yd.[ac]	.50/month closure fee (collection customers)[a]
Swift	Benson City	$5/cu.yd.[bd]	$2/cu.yd.[b]
Todd	Loergering Landfill Todd County Transfer Station	$5.25/cu.yd.[a] $25/ton[a] (until 4/1/89, then $35/ton)	none[a] none[a]
Traverse	no landfill		
Wabasha	Wabasha county Landfill	fee not listed[a]	not listed[a]
Wadena	Demolition Landfill	$5/ton[a]	none[a]
Waseca	Waseca County Landfill	$3.45/cu.yd.[ad]	$.80/cu.yd.[a]
Watonwan	Watonwan County Landfill	None; property taxes	None
Wilkin*			
Winona	Winona County Landfill	$22.50/ton[ad]	$2.50/ton[a]
Wright*			
Yellow Medicine	Lenzen	$3/cu.yd.[b]	none[b]

SOURCE:
a. Policy Report survey mailed to solid waste officers of all 80 greater Minnesota counties in February of 1988;
b. MPCA informal telephone and in-person survy of a land disposal facility owners/operators, February, 1988;
c. Surcharge included;
d. Surcharge not included;
e. May or may not include surcharge;
f. The unit of measurement was not specified and is assumed here;
* Did not respond toPolicy Report survey.

TABLE VII-6

METROPOLITAN AREA LAND DISPOSAL RATES
As of March 1, 1988

FACILITY	TIP FEE	SURCHARGE	TOTAL	TOTAL COST PER ADJUSTED TON*
Anoka Landfill	$12.00/cu.yd.	$1/cu.yd.	$13/cu. yd	$42.90/ton
Burnsville Landfill	$25.00/ton	$3.10/ton	$28.10/ton	$28.10/ton
Dakhue Landfill	$7.10/cu.yd.	.90/cu.yd	$8/cu.yd.	$26.40/ton
Freeway Landfill	$8.00/cu.yd.	$1/cu.yd.	$9/cu.yd.	$29.70/ton
Louisville Landfill	$5.10/cu.yd.	.90/cu.Yd.	$6/cu.yd.	$19.80/ton
Pine Bend Landfill	$8.00/cu.yd.	$1/cu.yd.	$9/cu.yd.	$29.70/ton
Woodlake Landfill	$6.35/cu.yd.	$1/cu.yd.	$7.35/cu.yd.	$24.26/ton

*Cubic yards are converted to tons using a conversion factor of 3.3.

SOURCE: March, 1988 survey by HDR Techserv for Ramsey/Washington Counties Resource Recovery Facility

WP/SW/PR/ExS/MV:eh

Paying Solid Waste Management Costs

Introduction

The means by which solid waste costs are paid varies greatly from county to county. Methods used include tax based systems (including property taxes and service fees) and facility based systems (including tipping fees, surcharges, and collection charges which may either be either on a flat fee basis or on a volume basis.) All systems use some combination of these financing systems. The choice of particular financing methods depends on a number of factors specific to local conditions. Each system may have advantages and/or disadvantages dependent, in part, on these local considerations.

Two key evaluative criteria that can be used in assessing funding mechanisms for covering solid waste management costs are efficiency and equity. In general, efficiency can be either collection efficiency (measuring the cost incurred to collect funds) or resource allocation efficiency (measuring the way in which the fund raising system impacts on efficient use of resources). Equity can be interpreted on the basis of an "ability to pay" principle (or income distribution principle) or as a benefits received principle. In general, facility based systems tend to be better in terms of resource allocation efficiency and benefits received equity, while tax based systems may tend to be preferable in terms of collection efficiency and income equity.

1. Service Fees

Some counties with large capital intensive management programs, such as waste to energy facilities, have begun to assess each household an annual service fee. This is being done by Otter Tail County, for example, which began assessing a fee in the fall of 1985. Each household and farm is assessed $25.00, seasonal homeowners pay $15.00 a year, and commercial business pay by volume; a grocery store in a small town will pay about $40.00 per year. Those who do not pay the service fee have it included on their property tax statement. The counties of Hubbard and Wadena have also assessed a service fee. Each county has a different fee structure.

In early 1988, Polk County announced its decision to establish a service fee to fund its solid waste management programs. The service fee will be included in the property tax statements for 1988. Three other counties, Clearwater, Mahnomen, and Norman, which are part of a Joint Powers Board with contracts to send waste to the Fosston incinerator, have also assessed service fees. Each county has a different fee structure, with Polk assessing the highest amount. Beltrami County decided to charge

$60.00 per ton tip fee at its transfer station rather than assess a service fee.

Pope and Douglas Counties have a Joint Powers agreement to own and operate the waste to energy facility in Alexandria. In 1986, both counties assessed an annual service fee of $45.00 on residential homeowners which appears on the property tax statement as a separate item. In addition, a solid waste levy is included within the property tax assessment and is based on the amount of land owned. A third funding mechanism, used by these counties, is the tip fee at the incinerator which in June 1988 was at $28.00 per ton. The tip fee is gradually being raised to reflect the actual cost of the incineration process. As the tip fee increases, the counties hope to lower the service fee.

For comparison purposes, in the Metropolitan Area, a Ramsey County resident pays about $14.00 per year in special assessments which are included on the 1988 property tax statement. The assessments are for the cost of the county's recycling programs, and the refuse derived fuel facility in Newport, Minnesota.

One of the advantages of a service fee is that it may encourage residents to use the services for which they are paying. For example, if a resident is paying for an incinerator, new landfill, transfer station or recycling program, he or she may be more likely to use the facility rather than disposing of waste on site by burning or burial.

The disadvantages are that it may be an economic hardship on people with low or fixed incomes, and the fee does not correspond to the amount of garbage generated, therefore providing no incentive to reduce, recycle, or compost. Another disadvantage is the political ramifications faced by county commissioners and administrators when a service fee is instituted. At a public meeting held in Fosston by the MPCA/WMB Joint Board Committee, county residents were angry about the fees and said they felt the fees were unfair. Opinions were expressed that the cost seemed extremely high, especially for older people on fixed incomes and farm families struggling to survive. Some citizens circulated a petition to recall the county commissioners who had voted for the service fee. The largest city in Polk County, East Grand Forks, had been exempted from the service fee because they send their solid waste to a North Dakota landfill.

2. Property Tax Assessments

Property tax support for solid waste programs varies. Some counties use the general revenues derived from property taxes to pay for their entire solid waste program. Other counties, with minimal programs, use tax revenues to pay for only some administrative costs. In some counties, property taxes may be the preferred or only funding mechanism. The major advantage of

funding solid waste management programs through property taxes is the ease of collection.

In addition, counties often chose property taxes rather than other funding methods for the following reasons. First, it often difficult to develop a fair fee based on volume for commercial and industrial businesses. Frequently it is difficult to find a clear correlation between the size of the commercial business and the amount of waste produced. Second, highlighting a solid waste assessment on the property tax statement can invite agitation from the public. If the cost is contained within the property taxes, people are more likely to pay and not complain. Third, there is the question of whether it is good policy for a county to single out programs. If a county highlights solid waste management on its property tax statement, then why not highlight other programs like libraries, human services, or police and fire protection. Where does one draw the line?

A major disadvantage of funding solid waste programs through property taxes is that there is no economic incentive for waste generators to participate in landfill abatement alternatives, such as waste reduction, recycling, and yard waste composting. Another disadvantage is that property tax levies are subject to statutory limits, and solid waste management facilities are no longer exempt from the levy limits.

3. County Surcharges

Minnesota Statutes § 473.843 (1986) provides that the operator of a mixed municipal solid waste disposal facility in the Metropolitan Area must pay a fee on solid waste accepted and disposed at the facility according to a legislatively prescribed formula. Half the proceeds are deposited in the metropolitan landfill abatement fund (which can be used for recycling programs) and the other half are deposited in the metropolitan contingency action fund; this is a mandatory surcharge. In addition, all counties have the authority to enact a discretionary surcharge. The mandatory surcharge applies only to metropolitan landfills.

In Greater Minnesota some counties have chosen not to utilize a surcharge for several reasons. The situation outstate is different from the Metropolitan Area where landfills are privately owned and a surcharge on the large volumes of waste disposed generates considerable revenue for metropolitan counties. It should be kept in mind that approximately two-thirds of the solid waste generated in the state comes from the seven county Metropolitan Area. The remaining one-third is spread throughout 80 greater Minnesota counties, with much of that concentrated in a few regional centers such as Duluth, St. Cloud, and Rochester. In rural Minnesota, the county or municipality often owns the landfill site and disposal is

provided as a county service. Some counties have stated that the tipping fee or property taxes cover the costs, and a surcharge is of no unique benefit because the county could achieve the same result by raising the tipping fee. Table VII-5, Tipping Fees at Waste Disposal Facilities, shows whether a landfill is funded by property taxes and whether there is a surcharge.

One of the disadvantages of a county surcharge in greater Minnesota is that even in counties with private landfills, the volumes are often so low that a surcharge does not generate significant revenues, and adds administrative costs in terms of staff time and money. In many parts of Minnesota, people manage their waste on-site. Under these circumstances, a volume based surcharge may not be an adequate funding mechanism.

4. Charges for Waste Collection and Disposal Services

a. Flat Fee System. The most common practice in the state is for waste haulers to bill customers at a flat rate for the collection and disposal service. The flat rate represents the average cost of providing service to the location and does not vary with waste disposal behavior or income.

b. Volume Based Fees. Another method of funding disposal is through volume based fees or bag system. Under this system the waste generator pays for collection and disposal based on the volume of waste produced rather than paying a flat fee. Proponents of volume based pricing assert that the current flat fee system rewards waste generation and disposal, and discourages recycling, waste reduction efforts, and yard waste composting. Further, volume based fees create an economic incentive for recycling which is not realized under a flat fee disposal system.

Volume based fees can either be based on the number of garbage cans set out for collection and disposal or a prepaid bag or tag system. Under the latter, households purchase special bags or tags and only those bags or garbage cans with tags will be collected. In Minnesota, small towns in Mower County have been using a bag system since the mid-1970's. Bags are purchased from the city clerk or at a grocery store. This system is not used in the city of Austin where garbage cans are required by ordinance as a public health measure.

A disadvantage of volume based fees is that a sharp increase in collection fees may result in illegal dumping due to "rate shock", rather than to an increase in recycling, waste reduction, and yard waste composting. This response occurred in New Jersey, where some towns faced with increasing garbage budgets have stopped using flat fees and have instituted volume based fees. Rather than pay double or triple garbage collection rates, hundreds of residents cancelled their garbage service and illegal dumping began to occur--behind churches, in school yards, parks,

and vacant lots. One way to avoid such an adverse reaction would be to phase in a volume based fee system, and to aggressively promote recycling, waste reduction, and yard waste composting as an alternative to disposal.

5. Tipping Fees

Tipping fees are usually not charged directly to waste generators. Generally, the waste haulers pay a tipping fee to a disposal facility operator and the fee is based on the amount of waste disposed. The total cost of a land disposal facility including development, operation and maintenance, closure and post-closure care and maintenance, and contingency action are often not reflected in the tipping fee.

One of the goals of the MPCA's solid waste rules is to ensure that land disposal facilities are planned, operated, and closed in an environmentally sound manner. The impact the rules will have on land disposal will be to raise the cost of landfilling, and to reduce the risk to human health and the environment of this management practice. The rules are designed to ensure that the full environmental costs of disposal technology are paid for up front. The trend of increasing landfill rates is not limited to Minnesota but is a national trend.

6. Efficiency and Equity in Solid Waste Financing

a. Efficiency. Efficiency has two distinct meanings in the financial management of solid waste systems. The first concerns the efficiency with which money is collected; more efficient systems require less work to collect a dollar of revenue. The two financial management systems discussed in this section are: tax-based systems, and facility-based systems. Tax-based systems are property taxation and service charges. The service charge system would generally be expected to be less efficient than property tax systems because setting up a new system of service charges costs money.

Facility-based systems are collection service charges (both flat fee and volume-based), tipping fees, and facility surcharges. The system of volume-based collection service charges is likely to be less efficient in terms of collection costs than the other systems because it requires more extensive accounting procedures. The other three facility-based systems could be expected to be about equally efficient in terms of the costs necessary to collect revenues.

Property tax systems probably have greater collection efficiencies than the facility based systems. This is because the property taxes collected to pay for solid waste management costs comprise only a small part of the total property tax collections. The system benefits from economies of scale.

Facility based systems are devoted solely to revenue collection for solid waste management purposes. There are no other programs that share the burden of fixed costs, so these scale economies are not realized.

The second measure of efficiency is more difficult to apply. This criterion involves assessment of the efficiency of resource allocation. If a community's resources are to be allocated efficiently, then those resources must be used in ways that yield the greatest net benefits for the community. When resources or services are undervalued or free, people tend to over-exploit them. In terms of waste management, this means that if the costs of waste management are not imposed on users in direct relationship to the extent of use, there will be less incentive to use alternative means such as recycling or waste reduction. Efficient allocation requires both correct pricing of resources and full assessment of all resource users. Both features are necessary conditions for efficiency and neither is sufficient by itself.

Some of the methods used to finance solid waste management systems alter prices for some users. Facility-based systems such as tipping fees, surcharges, and volume-based fees present resource users with prices that are related directly to the amount of waste they discard. Their bills increase if they dispose of more waste. This tends to increase allocative efficiency. Property tax and service fee systems, on the other hand, present waste generators with fixed prices for disposal services with no relation to their actual use of the system. Generators find that an extra unit of disposed waste is virtually free. Thus, there is no incentive to use the service efficiently. With respect to the efficiency of resource allocation, facility-based systems are likely to be better than tax-based systems. However, in instances where avoidance of the system is a problem (e.g. on-site burial or burning, illegal dumping), the facility-based system may require additional enforcement actions to assure system use.

b. Equity. One principle of equity focuses on the cost incidence of selected measures on income classes. A measure is considered inequitable if it imposes a greater burden on people in lower income classes and a lesser burden on people in higher income classes. This is often referred to as an "ability to pay" criterion. If considered strictly in these terms, none of the methods used to finance solid waste management systems are very equitable.

A second equity principle focuses on the benefits received. This principle would lead to a more facility-based system where actual users of the facility were paying the costs.

In general, facility based systems tend to be better in terms of resource allocation efficiency and benefits received equity, while tax based systems may tend to be preferable in terms of collection efficiency and income equity.

Ongoing Issues Relating to Solid Waste Management Costs

One issue of ongoing debate concerns the extent to which the state should provide financial assistance to counties or other entities in the implementation of solid waste management programs. Arguments against such assistance focus on the judgment that to the extent possible, generators should pay the full cost of managing waste. Only if this is the case will appropriate signals be given regarding the economic advantages of waste reduction or recycling. In addition, it is argued, solid waste services are not that costly to citizens when compared with other utilities and services. Thus, imposing additional costs on local citizenry is not all that burdensome. Arguments in favor of state assistance focus on the role of financial assistance in the facilitation of state goals and mandates. By providing assistance, the state gives guidance to counties as to which programs it gives a high priority. In addition, it provides the county with an economic incentive to implement such activities.

A further issue concerns whether current charges for waste management are covering the full cost of this activity, or whether some costs continue to be imposed on future generations through environmental or health impacts or through delayed remedial action costs, such as those being realized in Superfund actions. While it is unlikely that current charges are covering full costs, it should be noted that newly adopted MPCA rules regarding facility siting, design, and operation are designed to require that the full costs of activities be covered.

The cost of conducting closure, post-closure care and remedial actions at closed, abandoned, at short term land disposal sites (sites that do not have enough capacity or time to raise money needed for financial assurance) is a major concern. This is compounded by uncertainty as to the municipal liability cap for Superfund actions. A severe short fall in the revenues needed to conduct these activities is anticipated.

CHAPTER VIII: NONHAZARDOUS INDUSTRIAL AND SEPARATELY MANAGED SOLID WASTE STREAMS

Introduction

While the focus of this report is on mixed municipal solid waste (MSW), there are a number of other wastes which are technically a part of the solid waste stream, but which are generally managed separately from MSW. This group of wastes includes nonhazardous wastes from industrial sources (e.g., foundry sands, ink wastes, paint wastes, etc.) and those wastes from a variety of sources that are not managed along with MSW (e.g., used oil, waste tires, infectious wastes, white goods, etc.). A separate report, the Nonhazardous Industrial Waste Report (NIWR) prepared by the WMB in October 1987, discusses each waste stream in greater detail.

Waste Quantities

Data on the quantities of these wastes generated in Minnesota are incomplete and limited. The two primary data sources for industrial waste are the MPCA's codisposal program (under which generators who wish to manage their industrial waste in a mixed municipal landfill are required to submit an application and receive approval) and the MPCA's industrial landfill permit program, which requires landfill operators to submit quarterly reports including waste quantities managed. Since no regulatory data exists for most of the separately managed wastes, separate estimates of these waste streams must be made. Table VIII-1 contains available information regarding quantities of these wastes in Minnesota.

Management Methods for Nonhazardous Industrial Wastes

A number of high volume nonhazardous wastes currently being landfilled in Minnesota present significant opportunities for the greater use of waste reduction, recycling, and recovery. Current management practices and preferred alternatives for eight nonhazardous industrial waste streams, contaminated soil, empty containers, fossil fuel power plant ash, foundry sands, organic resins, paints and inks, pulp and paper mill sludges, and solid waste incinerator ash are included in the NIWR. As a result of 1987 amendments to the Waste Management Act, there are now a number of programs aimed at encouraging the reduction, recycling, and treatment of nonhazardous industrial wastes. These include two grant programs (for waste reduction and for processing facility development) and a technical assistance program through the Minnesota Technical Assistance Program (MnTAP).

Table VIII-1

Nonhazardous Industrial and Separately Managed Waste Quantities[1] Generated in Minnesota

Nonhazardous Industrial Wastes From Regulatory Data		Tons/year	% of Total
Pulp and paper sludge		211,512	36%
Ash		196,873	34
Unspecified	34,607		
Fossil fuel	162,266		
Foundry		47,584	8
Wood		30,233	5
Miscellaneous		27,353	5
Contaminated Soil		14,766	2
Organic resins		14,478	2
Food process		13,984	2
Water and wastewater treatment sludges		11,409	2
Paper waste		9,378	2
Empty containers		1,937	<1
Paint		1,275	<1
Printed circuit board		363	<1
Ink		308	<1
Glass sludge		56	<1
Asbestos		48	<1
Agriculture-nonfarm		26	<1
Total		581,583	100%

Separately Managed Wastes From Studies	
Used oil[2]	24 million gallons/year
Spent Lead-Acid Batteries[2]	945,000 batteries/year
Waste Tires[2]	3½-4 million tires/year
Sewage Sludge Ash	24,000 tons/year (metro area)
White Goods	320,000 appliances/year

[1]Data sources did not provide complete information, thus these quantities should be considered estimates only.

[2]While large portions of these waste streams are generated by households, they are usually collected at facilities (service stations, etc.) which are considered industrial. Therefore, for the purposes of this study, the entire quantity of these waste streams are considered industrial solid wastes.

Separately Managed Waste Streams

There are a number of waste streams which present particular challenges and problems in management and which, in many cases, have been singled out for special regulatory or programmatic treatment. Waste streams in this category that are discussed in the NIWR include used oil, spent lead-acid batteries (SLABs), waste tires, sewage sludge ash, infectious and pathological wastes, agricultural wastes, removed underground storage tanks, demolition and construction wastes, white goods, and household hazardous wastes. Additional recommendations can be found in the NIWR.

CHAPTER IX: WASTE EDUCATION

Introduction

Waste Education is widely recognized as an essential component of a successful waste management program. Waste management policy in Minnesota, which entails a shift away from the waste management practices of the past, will require a significant change in the attitudes and behavior of individuals and institutions. Education programs will necessarily play an important role in the implementation of new programs and policies. The development of specific waste education activities, targeted to key audiences and focused on critical messages, will be a key to future success.

State Agency Roles

Formal waste education programs have been ongoing in the state since at least the 1970's. These activities have included conferences, state fair exhibits, publications, school curricula, etc. In 1986, a task force (the Waste Education Roundtable) coordinated by the WMB, reviewed the status of waste education in the state. As a result of recommendations from this group, the 1987 Legislature established and funded a coordinating structure for waste education in the state. In response to this legislation, the chair of the WMB appointed a fifteen member Waste Education Coalition. Representation on this body includes several state agencies dealing with waste education, educational institutions and other public agencies, interested citizens, and industry.

A number of state agencies provide waste educational materials and programs. The MPCA, through its public information office provides exhibits, brochures, a speakers bureau, and audio-visual materials. Some of the topics of particular focus include proper management of household hazardous waste, and the promotion of preferred alternatives to land disposal. The MPCA also provides resources for school audiences and training programs and materials for local solid waste officials and operators. The WMB provided some similar activities through its public affairs and solid waste programs, as well as providing staff support for the work of the Waste Education Coalition.

The Department of Education, in June of 1985, adopted a rule which requires that environmental education be taught in elementary schools. While waste education can be integrated with environmental education programs, the rule does not require that waste be a topic, nor does the rule apply in secondary schools.

The Minnesota Environmental Education Board (MEEB), and thirteen Regional Environmental Education Councils (REECS), both created

in 1973, provide assistance in addressing regional needs for environmental education. MEEB/REEC is attached to the Department of Natural Resources and has approximately 200 active volunteers and a professional staff of five. Activities focus on providing programs in both formal educational contexts and non-formal community settings, including workshops, conferences, curricula, and presentations. Waste is just one of the topics addressed.

The Environmental Quality Board (EQB), as a result of recommendations at a 1986 state-wide Environmental Congress, has an Inter-Agency Environmental Education Task force, to provide advice concerning the EQB's work in environmental education. EQB activities will include a review of state environmental education efforts, a report on financing needs, and an update of the Environmental Education Resource Catalogue.

County Activities

Counties are also involved in waste education. Waste education must be addressed in the comprehensive county planning process, and indications are that many counties are either currently implementing or in the process of developing waste education programs. The activities mentioned most frequently include newspaper articles, speaking to local organizations, and school programs. Recycling, landfill problems, and waste reduction appear to be the topics receiving the greatest level of attention.

Waste Education in the Schools

A recent survey by the Waste Education Coalition indicates that teachers in Minnesota's schools are interested in teaching waste issues, but feel limited in terms of resources available and the time constraints of required curricula. Of those responding, 34 per cent indicate that some waste-related issue is part of the current curriculum; 94 per cent said they would be likely or very likely to teach waste education if the resources of their choice were available; and 88 per cent said the need for waste education is urgent or very urgent.

A key element in waste education in the schools is the "living example" in which students learn about waste management by actually participating in separation, reduction, and recycling. While some schools in Minnesota are recycling and using reusable utensils, no information is available on the overall status of waste management practices in the schools. Frequently mentioned barriers to improved waste management are inadequate space to store recyclables, fire code problems in storage and collection, availability of markets and collection services, and costs. The Coalition is currently studying these problems.

Other Providers

In addition to state agencies, local governments, and schools, a number of other organizations play an important role in waste education. Additional providers identified in the Waste Education Roundtable--Final Report (Minnesota Waste Management Board, August 1986) include the following:

* environmental organizations;
* research institutes;
* industry groups;
* ad hoc groups;
* national citizens' organizations;
* community organizations; and
* local waste management firms.

The Roundtable Report identified several factors which limit or influence the effectiveness of waste education providers. These include:

* the interest of the organization;
* limitations on staff and/or financial resources;
* credibility of the information source with the audience;
* priority given to waste as an issue and resultant commitment of resources;
* confusion caused by conflicting messages from different organizations; and
* availability of information provided by some organizations to non-members.

In summary, there are many waste education providers which could be utilized to a greater degree with improved coordination and communication. However, the state should not rely on other providers alone to consistently deliver information which reflects state policy.

The Waste Education Coalition

The Waste Education Coalition represents an effort to coordinate existing waste education efforts and to improve performance in this area. Three committees have been formed, a clearinghouse committee, a youth education committee, and a community information and education committee. The Coalition is currently involved in the following activities: establishing a computerized waste information clearinghouse and referral system; contracting with a consultant to modify and expand the Itasca County solid waste management education campaign; issuing a Request for Proposal for a consultant to develop a curriculum framework for grades K-6 and complete one instructional unit; and sponsoring a statewide advertising campaign focusing on recycling. Informational materials have been collected and are being

distributed through the clearinghouse. The Coalition's Budget, established at $190,000 for the 1988-89 biennium, has been committed to staff salaries and the previously described activities, including operation of the clearinghouse, More funding will be necessary to undertake additional projects.

CHAPTER X: WASTE REDUCTION

Introduction

Waste reduction is widely recognized as a preferred waste management method. In spite of this recognition, considerable debate and discussion exists about the definition of waste reduction. No definition currently exists in statute and working definitions being used at the federal and state level differ somewhat in terms of content and focus. It is important that a clear definition of waste reduction be established so that funding and program activities can be specifically directed toward this activity when appropriate.

In developing a definition of waste reduction, it will be important to address a number of issues: first, consistency with national approaches should be considered; second, a definition should be sought which can apply to all types of waste, including MSW, industrial solid waste, and hazardous waste; third, the definition must clearly differentiate between reduction, recycling, and volume reduction after the point of generation; and finally, the definition must recognize the role of reducing the environmental hazard of a waste as separate and distinct from reducing the amount of waste generated since reducing the toxicity of a product may result in a product which creates a larger volume of less toxic waste.

In general, the focus in this chapter is on MSW reduction and on reduction in waste quantities rather than on the reduction in environmental hazard. In the most general terms, waste reduction can be understood to be any activity that prevents the generation of waste. This may include product reuse (in original form), increased product life, reduced material use in production, and changing procurement, consumption, and waste generation habits.

Statutory Provisions Regarding Waste Reduction

Minnesota has enacted a number of laws relating to waste reduction. In the 1970's the legislature enacted two measures, a packaging review law and a plastic milk bottle ban, which were subsequently challenged in court. Subsequent to the court challenge, the milk bottle ban was repealed and the packaging review law, while still in statute, was weakened by the court decision and has not been implemented. A Packaging Advisory Committee issued a report in 1982 stating that "the package review process as developed under the 1974 MPCA Guidelines is impractical as an enforcement tool, and that its exercise would uselessly tie up MPCA resources."

The Waste Management Act of 1980 and subsequent amendments contain a number of provisions addressing waste reduction. Programs include a mandated state government resource recovery program, a requirement that all counties address waste reduction in their county plans, a grant program to encourage waste reduction and separation projects, technical assistance to units of government regarding procurement policies to stimulate waste reduction and recycling, technical and research assistance and waste reduction grants to generators of hazardous and nonhazardous industrial waste, and a ban on yard waste in disposal facilities. While a number of laws are on the books, in general the implementation of waste reduction activities at the state and local level appears to still be at very early stages and much needs to be done to improve waste reduction performance.

Current Waste Reduction Activities

At the state level, the Department of Administration administers a program to recover and reuse surplus state commodities and supplies. According to the Department, in fiscal 1986, this program led to the reuse of 12.18 tons of commodities and saved state agencies a total of $14,200. In addition, the Department of Natural Resources has initiated a number of "reuse" projects. No other specific state government waste reduction programs exist at this time.

The Minnesota Technical Assistance Program (MnTAP) provides technical assistance for waste reduction to industrial waste generators. MnTAP also coordinates mailings from two regional waste exchanges.

The Minnesota Public Interest Research Group (MPIRG), with funding from the Metropolitan Council, has established a pilot waste exchange for commercial waste, called BARTER (Businesses Allied to Recycle Through Exchange and Reuse). This program, aimed at Metropolitan Area businesses with 25 or fewer employees, helps businesses find ways to reuse or recycle materials that would otherwise be discarded.

The MPCA administers a Hazardous and Nonhazardous Industrial Waste Reduction Grants program. Generators of industrial wastes may apply for grants to evaluate the applicability or feasibility of waste reduction methods for their operations. This information is then shared with other generators. From 1984 to 1987 only generators of hazardous wastes were eligible for these grants. Since the Legislature expanded the program in 1987 to include nonhazardous industrial wastes, one grant has been awarded for nonhazardous industrial waste reduction.

At the local level, the counties' waste reduction efforts focus primarily on education. In addition, the results of a 1988 survey

show that out of 45 responding counties, 6 indicated that they practice office paper reduction, seven purchase in bulk, four have volume based fees existing in the county, and four purchase products with extended warranties. In the Metropolitan Area, there have been major educational campaigns to encourage the leaving of grass clippings on lawns.

No attempt has been made to survey waste reduction activities in the non-governmental sector. However, many examples of waste reduction activities can be cited, although the extent of such actions is limited. Examples include the following: grocery stores and food co-ops that provide waste reduction opportunities such as goods in bulk, use of returnables, and reuse of bags; corporations that implement office paper reduction or industrial waste reduction; non-profit groups such as Goodwill that facilitate the reuse of products; and waste exchanges that facilitate the utilization of waste products between firms.

Most of the waste reduction activities noted here are small-volume programs or in very early stages of development. The amount of waste actually avoided through these programs is not significant.

At the federal level, interest in and activities related to waste reduction have been minimal, and primarily limited to studies. Recent indications are that interest is increasing, but still at this point limited to studies and reports. There have been some additional activities in other states and Canadian Provinces. These actions have included steps to increase the use of refillable containers but have mainly focused on studies and reports assessing the appropriate steps to be taken in the area of waste reduction.

Approaches to Waste Reduction

As is apparent from the definition of waste reduction given at the beginning of this chapter, waste reduction activities can take many forms. This section presents four basic approaches to waste reduction described by W. David Conn, one of the leading authors of technical literature on waste reduction. These approaches are as follows:

1. Reducing the Quantity of Material Used Per Unit of Product

One example of this is the use of less aluminum per can in the production of beverage containers. Another example is the use of less glass in the production of bottles, thereby producing a thinner glass container. A third example is the use of reduced type and column size by the printing industry, allowing more print per page and requiring less paper. In all three cases, since less raw material is used in the production process, less

material will enter the waste stream. This approach includes changing product design and has had more success than other approaches which are directed at the manufacturer. Economically, it is in the best interest of the manufacturer to produce goods which require less raw material in their production. Therefore, in most cases, an incentive already exists to change product design. However, an awareness or recognition of potential financial gain through changes in product design may not exist with all manufacturers.

2. Increasing the Average Lifetime in Use of Durable and Semi-Durable Goods to Reduce Discards and Replacement Needs

An item that is durable for a longer period of time requires disposal and replacement less frequently. Standard parts for durable goods make repair of such goods easier. By reducing the number of replacements and by delaying the time of discard, less material enters the waste stream. However, durable products are likely to be discarded into the waste stream even though they are still usable. Also, changing product design to increase durability may produce more waste. An example of this is using more materials, such as thicker sheet metal, to increase the products' useful lifetime or durability. More waste may be generated in the production of more durable goods than in the production of single-use items. These factors need to be balanced when considering changes in product design to increase durability.

Because less durable products require replacement, which increases consumption, manufacturers may find less incentive to consider this approach to waste reduction.

3. Substituting Reusable Products for Single-Use "Disposable" Products and Increasing the Number of Times that Items are Reused

Examples of substituting reusable products for single use "disposable" products include using washable plates instead of disposable plates, cloth diapers instead of disposable diapers, and returnable/reusable bottles instead of single use bottles. The number of times a product can be reused depend both on the durability of the product and the willingness of the consumer to use and reuse it.

4. Directly Reducing the Consumption of Material Goods

This approach differs significantly from the three previously discussed approaches. The intent of this approach is to change behavior patterns. This involves encouraging people to "make do with less", the result being a decrease in consumption of material goods which will enter the waste stream. Because consumption is deeply embedded in American social values, and

because changes in behavior and attitudes require a significant amount of time and effort, this approach to waste reduction will be difficult to achieve.

One example of reducing consumption is the reduction of the use of office paper. This can be undertaken by individuals, businesses, and institutions. Office paper reduction methods include printing and copying on both sides of pages, using note-pads made of the backs of used paper, and single-spacing documents when possible. Another example of reducing consumption is changing procurement habits. Procuring materials in such a way as to reduce waste can be accomplished in several ways, one being life cycle costing. Life cycle costing means adding the costs inherent in using and disposing of a product to the product's market price. This can be an internal procedure, calculated by individual purchasing departments, or it can be a regulatory measure with the life cycle cost required to be shown on and added to the cost of products. Life cycle costing involves adding to a product`s invoice cost: the cost of eventual disposal; cost associated with repair and the estimated useful life of a product; and (optionally) the cost of the environmental impacts of a product.

Promoting Waste Reduction Approaches

Waste reduction can be promoted by:

- providing or recognizing financial incentives and/or disincentives;
- regulations;
- measures to promote voluntary waste reduction efforts; and
- government procurement and waste management practice.

These are discussed below.

1. Financial Incentives and Disincentives

Financial incentives encourage waste reduction through the economic gain derived from a particular waste reduction activity. Financial disincentives add monetary cost to waste-producing activities which could be avoided through waste reduction. Examples of financial incentives and disincentives include:

- product charges (such as taxes) based on expected eventual disposal cost for the product;
- rebates on reusable products and packaging;
- taxes on over-packaged products; and
- subsidies to offset the costs of achieving waste reduction.

Policies which use financial incentives to promote waste reduction have the advantage of encouraging rather than requiring

behavioral changes or changes in production processes. By providing education to both the public and private sectors, the unpredictability of outcome that may accompany financial incentives can be reduced.

A disadvantage of using financial incentives to encourage waste reduction is that the levels of taxes or subsidies have to be significant or large enough to promote change yet small enough to be politically acceptable. Additionally, the costs of administering tax and subsidy programs has hampered the development of these types of policies.

One financial incentive that is likely to promote waste reduction and recycling is volume-based garbage collection fees. Waste reduction can be encouraged in conjunction with volume based fees by raising citizens' awareness of waste reduction opportunities in their homes and businesses. Examples of opportunities to reduce waste in the home include using cloth napkins instead of paper, using rags instead of paper towels, using cloth diapers instead of disposable diapers, reusing bags, jars and other containers, etc. A more detailed discussion of volume-based pricing will be found in Chapter VI: Collection and Transportation.

2. Regulations

Regulatory options include standards or restrictions on the characteristics of products such as durability and disposability. Establishing minimum warranty requirements or standardized parts to promote reusability and repairability are regulatory measures to achieve waste reduction.

Although regulations represent a direct approach to accomplishing waste reduction, and also provide a predictable outcome, they are often recognized as government intervention in the "free market" or an infringement on personal freedoms. Regulatory controls therefore receive only limited political support.

3. Voluntary Efforts

Measures to promote voluntary efforts include research and public education. The success or effectiveness of these activities are difficult to predict and measure. However, since voluntary efforts interfere with personal freedoms the least, they are more widely accepted than either regulatory or financial measures. Voluntary efforts are therefore considered the policy of choice by most governments.

4. Government Waste Reduction Practice

Waste reduction practiced by governments through their own internal procurement, consumption, and waste generation practices

can have a significant effect on overall waste reduction in their jurisdictions. Internal government waste reduction practices can contribute to overall waste reduction in several ways. At the state and federal levels, government procurement practices aimed at waste reduction can bolster the market for such items as reusable/refillable packages and other products which foster waste reduction. Government use of life cycle costing to determine overall costs of a product (including cost of repairs, and eventual disposal) can not only increase the market for the products chosen, but can also provide information on the calculations used to determine the life cycle costs of these items.

Similarly, government internal waste reduction practices not only set examples, but may also generate "how-to" information that can be disseminated to business and industry. Such practices can also serve as test cases for the feasibility and effectiveness of certain waste reduction methods. Measuring waste generation at government offices and operations can provide baseline data from which waste reduction may be measured as practices are instituted.

The Costs of Waste Reduction

The costs of waste reduction vary greatly from measure to measure and situation to situation. By definition, waste reduction saves some disposal costs. However, the amount of cost savings, if any, will depend on whether the generator's disposal charges are based on the amount generated. (For most residential collection in Minnesota, this is not the case, although it appears that for commercial and industrial generators, disposal charges often are based on amount disposed.) Waste reduction can also decrease the cost of raw materials or supplies, as in the case of printing on both sides of the page or single spacing documents. In this case, while there may be definite costs savings, there may also be initial investment costs (e.g. in a two sided copier) or perceived costs in terms of the appearance of documents. One key problem for many waste reduction activities, particularly in industry or business, may be the perceived high initial cost which is only repaid over time.

Barriers to Expanded Waste Reduction Efforts

Difficulty in quantifying the costs or in measuring trade-offs is one reason why waste reduction practices are not more widespread. Other reasons include cultural biases which favor convenience and newness over conservation and a general predisposition in environmental solutions to go to the "end of pipe" and deal with something after it is generated; inertia, both institutional and individual, must also be mentioned. A final barrier to the implementation of waste reduction measures is the difficulty, in a broad context, of measuring effectiveness. It is very difficult

to measure something that is not generated and this makes it difficult to assess and or predict the impacts of waste reduction activities.

CHAPTER XI: RECYCLING

Current Status-Greater Minnesota

No comprehensive data exist on the extent of recycling opportunities or on the actual amounts of waste being recycled in Greater Minnesota. In June of 1988 the WMB published a recycling directory which lists the known recycling centers in Greater Minnesota. Map XI-1 shows the recycling facilities identified in this directory. As shown on the map, 29 counties have been identified as having multi-material recycling centers available. Approximately 50 do not have multi-material opportunities available. In addition, 13 counties were identified as having no known recycling centers. Information on the extent of curbside programs is even more limited. However, a review of recent news clippings and other sources indicates that there has been a recent growth in the number of such programs. (A county by county summary of this information is contained in Appendix C.)In terms of actual quantities of material being recycled in Greater Minnesota, a 1988 survey of county plans and solid waste officers indicated that approximately 44,000 tons of waste were being recycled in 1987. (See Table XI-1.) This constitutes approximately 4 per cent of the total waste stream.

Current Status-Metropolitan Area

Recycling opportunities are available for a large portion of Metropolitan Area residents either through curbside programs or drop-off or buy back centers. Actual quantities of source separated (and recycled) wastes are estimated to be approximately 107,600 tons or about 5.4 per cent of the current waste stream. This "new" recycling is, according to the Metropolitan Council, in addition to the approximately 23 per cent of the waste stream that was estimated to be recycled in 1985. It should also be noted that these figures, in contrast to those reported for Greater Minnesota, include yard waste that is separated and composted.

Current Status-Role of the Private Sector

While no attempt has been made in this report to comprehensively assess the role of the private sector in recycling activities in Minnesota, it should be noted that private sector activities and investments have played a large role in achieving current recycling levels. State actions to spur recycling around the state should be carefully designed so as not to disrupt this current and growing private sector activity. At the same time, private sector actors will need to recognize their responsibility to provide the complete, accurate, and verifiable data which is

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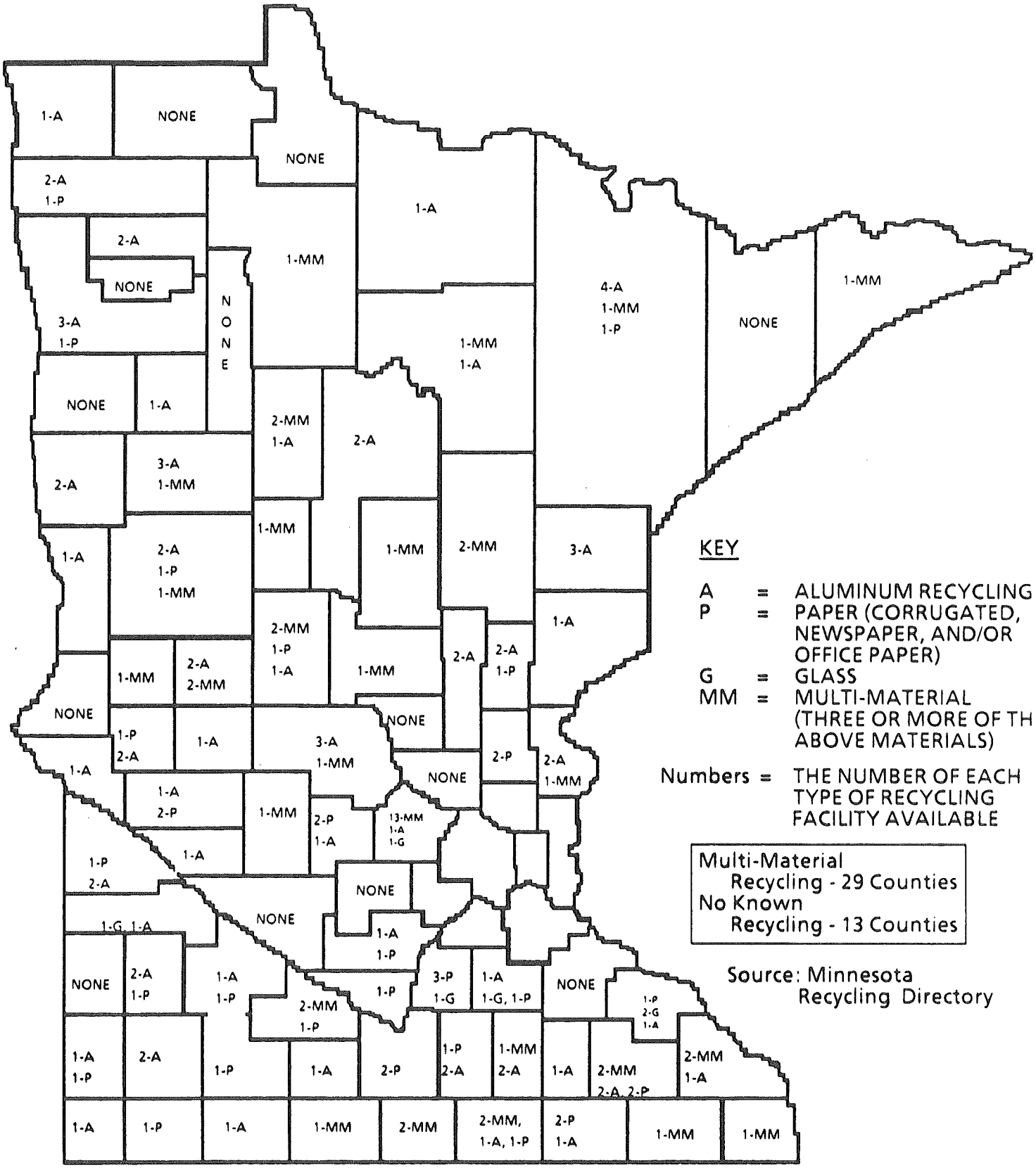
MAP XI-1
RECYCLING FACILITIES IN GREATER MINNESOTA 1987



KEY

A = ALUMINUM RECYCLING
P = PAPER (CORRUGATED, NEWSPAPER, AND/OR OFFICE PAPER)
G = GLASS
MM = MULTI-MATERIAL (THREE OR MORE OF TH ABOVE MATERIALS)

Numbers = THE NUMBER OF EACH TYPE OF RECYCLING FACILITY AVAILABLE

Multi-Material Recycling - 29 Counties
No Known Recycling - 13 Counties

Source: Minnesota Recycling Directory

TABLE XI-1
SOLID WASTE RECYCLING STATUS AS OF FEBRUARY 1988:
GREATER MINNESOTA COUNTIES

COUNTY	WASTE GENERATED (tons per year)	WASTE RECYCLED (tons per year)	%	SOURCE	YEAR
Aitkin	8395	110	1%	SWO	1987
Anoka	-----	-----	--	-----	-----
Becker	27375	250	0.9%	DAC & SWO	1987
Beltrami	14235	853	6%	DAC & SWO	1987
Benton	21535	1307	6%	SWO	1986 est.
Big Stone	22920	1146	5%	SWO	1986
Blue Earth	31025	1241	4%	SWO	1987
Brown	19710	1825	9%	SWO	1985
Carlton	20805	-----	--	no idea - SWO	
Carver	-----	-----	--	-----	-----
Cass	9125	10	0.1%	Staff member	
Chippewa	10585	552	5%	SWO	1987
Chisago	15330	155	1%	SWO	1987
Clay	25500	1275	5%	SWO	1986
Clearwater	3285	-----	--	no idea - SWO	
Cook	3650	53	1%	SWO	1987
Cottonwood	5110	0	0%	SWO	1986
Crow Wing	25500	632	2%	SWO	1986
Dakota	-----	-----	--	-----	-----
Dodge	7300	50	0.6%	SWO	1987
Douglas	20805	-----	--	no idea - SWO	-----
Fairbault	7665	546	7%	SWO	1987
Fillmore	9125	350	4%	SWO	1987
Freeborn	20075	2234	11%	SWO	1987
Goodhue	20075	-----	--	not available	-----
Grant	2555	81	3%	SWO	1987

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TABLE XI-1
SOLID WASTE RECYCLING STATUS AS OF FEBRUARY 1988:
GREATER MINNESOTA COUNTIES

COUNTY	WASTE GENERATED (tons per year)	WASTE RECYCLED (tons per year)	%	SOURCE	YEAR
Hennepin	-----	-----	--	-----	-----
Houston	7300	29	0.4%	SWO	1986
Hubbard	7300	68	0.9%	SWO	1987
Isanti	10950	111	1%	SWO	1987
Itasca	36500	30	0.08%	SWO	1987
Jackson	5840	165	3%	SWO	1987
Kanabec	8760	86	0.9%	SWO	1986
Kandiyohi	16790	1460	8%	SWO	1987
Kittson	2190	-----	--	not available	-----
Koochiching	7300	31	0.4%	SWO	1987
Lac Qui Parle	4015	99	2%	SW PLAN	
Lake	5475	10	0.1%	SWO	1987
Lake of the Woods	2555	negligible amts.	--	SW PLAN	-----
Le Sueur	13870	negligible amts.	--	SW PLAN	-----
Lincoln	4015	40	0.9%	SWO	1986
Lyon	22630	954	4%	SWO	1986
Mahnomen	1460	-----	--	no idea - SWO	-----
Marshall	4745	-----	--	not available - SWO	-----
Martin	15330	1007	6%	SW PLAN	-----
McLeod	21900	1421	6%	------	-----
Meeker	6205	265	4%	SW PLAN	-----
Mille Lacs	9490	91	0.9%	SW PLAN	-----
Morrison	12775	710	5%	SWO	1986
Mower	27375	2000	7%	SWO	1987
Murray	6570	138	2%	SWO	1987

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TABLE XI-1
SOLID WASTE RECYCLING STATUS AS OF FEBRUARY 1988:
GREATER MINNESOTA COUNTIES

COUNTY	WASTE GENERATED (tons per year)	WASTE RECYCLED (tons per year)	%	SOURCE	YEAR
Nicollet	10220	negligible amts.	--	SW PLAN	-----
Nobles	15695	1213	7%	SW PLAN	-----
Norman	4015	-----	--	no idea - SWO	-----
Olmsted	62050	4964	8%	SWO	1987
Otter Tail	29200	700	2%	SWO	1987
Pennington	9125	700	7%	SWO	1987
Pine	9855	99	1%	SW PLAN	
Pipestone	9855	320	3%	SWO	1987
Polk	19710	-----	3%	not available	-----
Pope	6935	69	1%	SWO	1986
Ramsey	-----	-----	--	-----	-----
Red Lake	1825	18	1%	SWO	1987
Redwood	9490	600	6%	SWO	1986
Renville	8030	310	3%	SWO	1986
Rice	23360	700	3%	SWO	1987
Rock	6570	400	6%	SWO	1987
Roseau	4380	0	0%	SWO	1987
Scott	-----	-----	--	-----	-----
Sherburne	29930	391	1%	SWO	1986
Sibley	5840	negligible amts.	--	SW PLAN	-----
St. Louis	102200	7154	7%	SW PLAN	-----
Stearns	90520	400	0.4%	SWO	1987
Steele	20805	600	3%	SWO	1987
Stevens	4380	150	3%	SWO	1986
Swift	5110	150	3%	SWO	-----

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TABLE XI-1
SOLID WASTE RECYCLING STATUS AS OF FEBRUARY 1988:
GREATER MINNESOTA COUNTIES

COUNTY	WASTE GENERATED (tons per year)	WASTE RECYCLED (tons per year)	%	SOURCE	YEAR
Todd	5475	200	3%	SWO	1987
Traverse	2190	22	1%	SWO	-----
Wabasha	7300	250	3%	SWO	1986
Wadena	6205	573	9%	SWO	1987
Waseca	6935	945	13%	SWO	-----
Washington	-----	-----	--	-----	-----
Watonwan	4745	-----	--	not available	-----
Wilkin	3285	0	0%	SWO	1986
Winona	35900	387	6-8%	SWO	1987
Wright	38325	480	1%	SWO	1987
Yellow Medicine	4380	135	3%	SW PLAN	-----
Totals:	1,216,865	43,315	3.6%		

Note: Information has been taken from either the County Solid Waste Management Plans or by talking to the County Solid Waste Officers. All numbers should be considered estimates. The total numbers do not include the (7) metropolitan counties, or the fourteen (14) counties where information was either not available or the amounts being recycled were negligible.

** Includes estimates of private recycling not shown in the Waste Recycled column. Does not include 12% for yard waste composting which is occurring.

SWO = Solid Waste Officer
DAC = Day Activity Center
no idea = Solid Waste Officer could provide no figures

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critical for the development of effective recycling policies and programs.

The Appropriate Role of Recycling

Recycling is universally acknowledged to play a key and preferred role in a well integrated waste management strategy. In Greater Minnesota, county planning rules set a 25 per cent target for recycling. Counties are not required to meet this goal, but rather are required to develop feasible and prudent recycling programs based on local conditions. To the extent that the local goal falls short of the 25 per cent, adjustments are made in the cost calculations on which the best alternative is to be chosen. In the Metropolitan Area, counties must achieve a source separation goal of 16 per cent by 1990. As noted above, this figure includes yard waste and is in addition to the 23 per cent recycling estimated to be occurring in 1985.

Considerable debate exists over the precise percentage of the waste stream which can be handled by recycling. Studies which assess the portion of the waste stream which is technically recyclable have identified figures in the neighborhood of 70 to 80 percent. Practical considerations such as markets and costs must be considered as well as technical factors in setting realistic goals for recycling. Based on a number of studies, it can be concluded that recycling rates approaching 50 per cent might ultimately be achieved as recycling is maximized. However, such a figure must be approached very carefully when regional differences are taken into account.

Factors Affecting the Extent of Recycling

There are a number of factors which have led to the relatively small amount of recycling which is currently taking place in Greater Minnesota. Among them are the following:

1. Definition and measurement: Definitions and measurement problems relating to recycling in Minnesota have caused a good deal of confusion and disagreement. Questions that should be resolved include the following: What is the role of source vs centralized separation? Are materials recyclable after separation or because of their potential for separation? Does recycling require reuse or is separation sufficient? (The definition of recycling in the Waste Management Act requires reuse, but other definitions used in implementation documents do not always include reuse. This question also impacts how we measure "recycling": do we measure tonnages separated or tonnages reused?) Should yard waste be included in recycling figures? Should the focus be on maximum participation or maximum quantities? What sectors should be included? What base year should be used for calculating percentages? Are reporting

requirements sufficient for private recycling and redemption programs?

2. Markets: Low and/or unstable prices for recycled materials have been and continue to be a major impediment to the growth of recycling in Minnesota. In addition, the location of major markets in the Metropolitan Area puts recycling efforts in Greater Minnesota at a cost disadvantage. Stable markets appear to exist for paper, glass, and aluminum in residential programs and for corrugated cardboard and office paper in the commercial sector. Major problems in Minnesota focus on markets for plastics and for tin (or bimetal) cans, in addition to the problems related to transportation issues in Greater Minnesota.

Currently, the MPCA has primary responsibility for market development issues in Greater Minnesota. Efforts include a grant program to stimulate end users (a grant was recently awarded for a plastics recycling facility feasibility study), a governmental procurement promotion program, and the coordination of other market development activities (e.g., market directories and catalogues, labeling issues).

3. Costs of Recycling: Two key issues related to costs have hindered the growth of recycling. The first is the long-standing notion that recycling activities should be "profitable" in the narrowest sense of the word rather than viewed as a public service such as ordinary garbage collection which may incur net costs. The second is the difficulty in accurately estimating the per-ton cost in light of significant unknowns regarding participation rates and prices to be received for recycled goods. While recycling is generally thought to be a "cost-effective" strategy, little hard evidence on actual costs exists, especially for programs in rural areas.

The major elements of costs for recycling include collection, processing, transportation to market, program administration, and public education to stimulate participation. Revenues should include receipts from sale of materials and avoided disposal costs. A key element in making recycling programs effective is to find ways of getting the savings in disposal costs to the recycling program. Rural areas with small, scattered populations and long distances from markets are at a particular disadvantage in terms of recycling economics. While most cost work has been done in urban areas, a recent study by the Minnesota Project found a tremendous range in recycling program economics, ranging from a profit of $22 per ton in Maine, to a cost of $141 per ton in Morrison County, Minnesota. A great deal of work needs to be done to identify and improve the costs of recycling, particularly in Greater Minnesota.

4. Education and Human Resources: Recycling requires direct and significant behavioral change by the general public. As such, it

requires a firm commitment to education and requires community organization skills and activities not required for more centralized waste management activities. The significance of local leadership and technical assistance to develop such approaches cannot be overemphasized.

5. Funding Mechanisms for Recycling: Many actors are involved in the recycling system: counties, cities, the private sector, the state. Obtaining funding for recycling activities in this complex system can be difficult. In deciding on funding methods, two key issues must be considered. The first is the sufficiency of funds and the second is the need to build recycling incentives into the financing mechanism for solid waste management. There are currently four sources for funding being used: state funding, landfill surcharges, county taxes or service charges, and private sector funds.

State Approaches to Support Recycling

While there are many explanations for the relatively low levels of recycling in Greater Minnesota, one key factor that must be considered is the extent of support given by the state. A review of past state actions indicates that while there has been consistent policy support, there has been a somewhat less consistent and aggressive action program to foster recycling. Specifically, state actions have been marked by:

* limited financial support when compared with funding to other alternatives;
* limited technical assistance;
* failure to pass container deposit or comprehensive recycling legislation;
* limited market development activities;
* limited state government recycling efforts;
* lack of clear goals; and
* failure of packaging initiatives.

An examination of activities in other states gives an indication of the kinds of activities that Minnesota could undertake if the state wishes to more aggressively encourage recycling. These measures include:

1. Increased Technical Assistance and Education: For example, New Jersey has created a special Office of Recycling to provide direct assistance to citizens and municipalities.

2. Mandatory Recycling: In Greater Minnesota, counties are currently mandated to consider and evaluate recycling as an option in their county plans. Other states have gone beyond this to mandate the provision of "opportunities to recycle" (e.g. Oregon, Wisconsin, Washington) or to mandate a certain level of citizen participation or the achievement of certain targets

(e.g., Minnesota Metropolitan Area, New Jersey, Rhode Island, Connecticut.)

3. Container Deposit Systems: Ten states have container deposit legislation as means of addressing a portion of the waste stream, reducing litter, and educating consumers to recycle. Programs vary in terms of the amount of the deposit and the use of the unclaimed funds. Attempts over a number of years to introduce a deposit system in Minnesota have been unsuccessful.

4. Increased State Financial Support: A number of states provide economic incentives and direct financial support to develop recycling programs. There are a wide variety of options for the use of state financial support. Some of these options along with some "oft-heard" pros and cons are shown in Table XI-2.

Funding Options for State Financial Support

States use a wide variety of funding mechanisms to support recycling activities. New Jersey, Connecticut, and Vermont have used general fund revenues. Proceeds from the sale of bonds are used in Michigan and Maine. Waste Management facility surcharges are used in Illinois, New Jersey, Maine and Vermont. A number of states, including Washington, Nebraska, Rhode Island, and Ohio use litter taxes imposed on products or receipts from products that are related to litter. A packaging tax, aimed at stimulating reduced packaging and/or the use of recyclable packaging has been introduced in a number of states (including Minnesota) but has not passed anywhere yet. Table XI-3 lists a number of options for fund raising mechanisms along with some "oft-heard" pros and cons associated with each method.

TABLE XI-2

USES OF STATE FUNDS - ADVANTAGES AND DISADVANTAGES*
page 1

Type of Activity	Advantages	Disadvantages
1. Support Activities - Market Development - Education/Promotion - Technical Assistance - Public Sector Recycling	1. Helps across the board - existing system/new entrants - public sector/private sector - regional balance? 2. Allows maximum flexibility in local approach 3. Avoids "ongoing subsidy"	1. Indirect Impact/uncertain outcome 2. No guarantees of ongoing program success 3. More money to state/less to support actual program expenses.
2. Seed Money or Start Up Funding - Capital Assistance - Low Tech Grants	1. Combined with technical assistance, good "start up" technique 2. Can be used to enhance existing programs or start new ones 3. Allows for local flexibility in method 4. Even with limited amount, can change key economic considerations	1. Favors entities eligible (public vs private?) 2. Does not guarantee long term program success. 3. Requires staff and administrative procedures for grant award and review.
3. Ongoing Program Subsidies - Recycling tonnage payment - Population based - Based on particular perceived need - staff (local) - transport - equipment - public ed	1. Helps assure long term success of programs 2. Could be targeted on "hard to recycle" materials 3. Can be targeted on greatest perceived need or to allow for local flexibility 4. Could be temporary until sufficient markets are developed	1. May stimulate long term dependence on subsidy 2. Expensive 3. Could favor eligible (public) programs over others 4. Might need complicated administrative procedures
4. Tax Incentives	1. Can be targeted to gain desired outcomes 2. Provides economic incentives to encourage business development 3. Relatively quick to enact & implement 4. Can provide symbolic support to recycling businesses	1. Generally a small impact on businesses' total operations 2. May discriminate against different businesses within the same industry (new vs. established for example) 3. Low public visibility

* Advantages & Disadvantages listed were gathered by staff from a variety of sources. No attempt has been made to analyze or evaluate these arguments.

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TABLE XI-2

USES OF STATE FUNDS - ADVANTAGES AND DISADVANTAGES*
page 2

Type of Activity	Advantages	Disadvantages
5. State Ownership and/or Operation of Portions of a Recycling System	1. Allows coordination of services 2. Could transport & market large volumes of materials	1. Reduces options for local choice & control
6. Research	1. Could produce new products/markets 2. Could provide a clearinghouse/resource for local units of government	1. No guarantee of actual market results

* Advantages & Disadvantages listed were gathered by staff from a variety of sources. No attempt has been made to analyze or evaluate these arguments.

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TABLE XI-3

FUND RAISING MECHANISMS ADVANTAGES AND DISADVANTAGES*

Type of Activity	Advantages	Disadvantages
1. General Revenue Funding	1. Must be reviewed every two years 2. No limit on uses 3. No "unfair" treatment of specific items, business 4. Administratively simple	1. Must be reviewed every two years 2. Sensitive to budget pressures and priorities 3. Amounts likely to be limited 4. No link to problem
2. Bond Funds	1. Well established mechanism for public assistance for capital costs 2. Precedent for project support	1. Limited purpose (in Minnesota) - capital costs - public sector or joint venture
3. Landfill or other Facility Surcharges	1. May provide incentive to reduce reliance on less favored waste management methods 2. Precedent in Metro and voluntary in greater Minnesota 3. Link to problem	1. If local, uneven impact on counties 2. Increased administration 3. Based on decreasing revenue source 4. High surcharge necessary to raise sufficient funds.?
4. Packaging Taxes	1. Provides incentive (possibly) to reduce packaging or to use recycled material 2. Small fee raises significant funds 3. Ongoing once established 4. Link to problem	1. Administratively complex 2. Unfair focus on one segment 3. Business climate
5. Gross Receipts, etc. Taxes	1. Administratively relatively simple 2. Ongoing once established 3. Can raise significant funds	1. Business climate 2. No waste reduction/recycling incentive 3. Unfair focus on business
6. Unredeemed Deposits	1. Link to problems - Those who don't return, pay 2. Ongoing source once established	1. Funding may vary depending on redemption rate

* Advantages and Disadvantages listed were gathered by staff from a variety of sources. No attempt has been made to analyze or evaluate these arguments.

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CHAPTER XII: COMPOSTING

Introduction:

Composting is the controlled microbial degradation of organic waste to yield a humus like product. Through the process of composting, waste materials such as yard waste or portions of the MSW stream can be reduced in weight and volume and converted into a usable soil amendment product. While composting can be applied to a number of different waste streams, the focus here is on MSW composting and, to a lesser extent, yard waste composting.

Composting is one method for managing the nonhazardous, biodegradable portion of the waste stream. The composting of yard wastes alone can eliminate a significant portion of the waste stream from disposal or processing facilities and is characterized by few known environmental problems. MSW composting is also of great attraction to those seeking an alternative to direct landfilling and incineration for the non-recyclable portion of the waste stream. While estimates vary, it appears that 40-65 per cent of the total waste stream (by weight) can be composted. Composting is also attractive because it requires waste sorting prior to processing and thus fits well into an integrated management system.

Current Status of Facilities

Currently there are two MSW composting facilities operating in Minnesota and nine more at some stage of development. (See Table XII-1). Yard waste projects are much more common in the state although no attempt is made in this report to identify all such operations. An informal survey done in October 1987 identified at least 25 centralized yard waste composting facilities in Greater Minnesota. According to the Metropolitan Council, there are approximately 36 curbside yard waste collection programs and 25 drop off sites in the Metropolitan Area. The growth in yard waste composting facilities will be great over the next several years as a result of 1988 legislative action banning the disposal of yard waste in a land disposal facility or resource recovery facility (except for composting). This ban goes into effect on January 1, 1990 in the Metropolitan Area and on January 1, 1992 in Greater Minnesota.

Environmental and Public Health Issues

As is the case with all waste management processes, composting is not risk free. Wastes to be composted may contain disease causing agents (pathogens), toxic metals, and/or toxic organic contaminants. The potential presence of these problem materials are of concern both in terms of occupational health and safety in

TABLE XII-1

MIXED MSW COMPOSTING FACILITIES

DEVELOPER/LOCATION	TYPE	SIZE	STATUS
	EXISTING	**FACILITIES**	
1. Fillmore County/Preston	Aerated Static Pile	25 TPD	Operating
2. Recomp Inc./St. Cloud	In-Vessel	50 TPD	Operating
	UNDER	**DEVELOPMENT**	
3. Lake of the Woods County/Baudette	Aerated Static Pile	10 TPD	Final Design and Engineering Underway
4. Swift County/Benson	Aerated Windrow	20 TPD	CAP Grant Application Under Review
5. Crow Wing County/Brainerd	In-vessel and Windrow	100 TPD	Feasibility Study Concluded; Preparing CAP Grant Application
6. City of Farmington/Farmington	Aerated Windrow	25 TPD	Feasibility Study Concluded; Preparing CAP Grant Application
7. Reuter/Chaska	Aerated Windrow	300 TPD (Preprocessed Waste)	Awaiting Chaska City Council Final Approval Permit Application Under Review at MPCA
8. Rice County	Aerated Windrow	125-150 TPD	Preliminary Design & Engineering Underway
9. Wright County	Aerated Windrow	165 TPD	RFP Issued
10. Scott/Carver Counties/Louisville Township	Undetermined	200 TPD	Vendor Proposal Under Review
11. Martin County	Undetermined	100-150 TPD	Preliminary Design and Engineering Underway

TPD = Tons Per Day

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the composting plant, and in terms of their potential presence in the final compost. Proper operation of composting facilities is critical to insure that workers are protected and that the finished compost is of sufficient quality to be appropriate for markets. Regulation of the final use of compost products (discussed below) is important to assure the protection of human health and the environment. There are no current requirements for training and certification of compost operators or inspectors.

Pathogens present in MSW create some risks for facility workers, but these can be minimized through operating and safety procedures. Pathogens are believed to create very little risk for users of compost as a proper compost process kills pathogens. Heavy metals, such as cadmium, lead, and chromium can be found at various levels in the waste stream. These metals can be toxic to plants and could potentially be concentrated in plants to the point of presenting a risk to humans or animals consuming the plants. Heavy metals can bioaccumulate and cause a potential health hazard. Regulations regarding the use of compost, discussed below, are necessary to assure that the quality of the compost is sufficient to warrant particular uses. Toxic organic compounds present a third potential environmental threat. Although research has been limited, studies to date have indicated that levels of such compounds are not generally high enough to be a cause for concern in the utilization of compost.

Regulatory Context

The MPCA's solid waste rules, adopted in September of 1988, establish the regulatory framework for both MSW compost and yard waste compost. The rules contain requirements for worker health and safety, as well as odor, dust, and noise control. The rules establish two classes of compost. Class I is compost (made without the use of sewage sludge) that does not exceed set limits for heavy metal and certain organic contaminants. The use of Class I compost is unrestricted. Class II is all other composts and the use of Class II compost is restricted to areas where land use and soil qualities are appropriate.

In addition to these MPCA regulations, the Minnesota Department of Agriculture requires that all compost sold in the state be registered and labelled as to certain constituents. Compost facilities would also be covered by the state Occupational Health and Safety Administration (OSHA) program and its requirements for right-to-know training and for limits on noise, heat, and dust levels.

Marketing Issues

The ability to market a final compost product is a critical issue for the economic feasibility of MSW compost facilities. This, in turn, depends on the performance of the compost in various uses,

on the extent and consistency of compost quality, and on acceptance by potential users. Because MSW composting is a relatively new technology in the U.S., research needs to be done to fully implement the technology. Currently, the University of Minnesota is engaged in a major research project on compost use and quality. In addition, the MPCA is in the process of preparing a manual and training program for facility operators expected to be ready in late 1988.

A potentially key element in the development of markets for compost is the Governor's Order on Compost, issued in April 1985. This Order requires state agencies to use compost if it is competitive with alternative soil amendments. While this Order has led to some testing and experimentation, in general it does not appear that state agencies are actively pursuing the use of yard waste or MSW compost.

While MSW composting has been practiced in other parts of the world, the practice is new to the United States. For this reason there are a number of unanswered questions regarding the economics and environmental impacts of the technology. Further research is needed to establish this technology on a firm and permanent economic and environmental footing. Given the strong interest in this technology as a realistic alternative to land disposal and incineration, particularly in smaller counties in Greater Minnesota, it is imperative that the state take steps to develop needed information about this technology.

CHAPTER XIII: WASTE-TO-ENERGY

Introduction

Waste-to-energy is the incineration of raw or processed mixed municipal solid waste with the production of energy, steam or electricity, as a secondary process. Waste-to-energy technology has two distinct advantages - volume reduction and the capability to manage a large portion of the waste stream.

Waste-to-energy systems developed in response to the recognized need to consider alternatives to land disposal and the energy crisis of the late 1970's. The implementation of waste-to-energy systems was encouraged and supported by funding provisions of the Waste Management Act of 1980, which provided capital assistance through the Waste Management Board's (WMB) grant programs, and by county planning rules. Consider the following: Greater Minnesota generates 3500 tons per day of municipal solid waste and has 1150 tons per day of permitted capacity at waste-to-energy facilities while the Metropolitan Area generates 5400 tons per day (more recent estimates project this figure at 7700 tons per day) and has 3900 tons per day of permitted capacity. These figures show the extent that waste-to-energy systems have been embraced as a solid waste management option.

Waste-to-Energy in an Integrated Management System

Waste-to-energy facilities have been implemented without aggressive integration of alternative management options for that portion of the waste stream that is non-burnable and/or decreases the efficiency of the incineration process. The removal of the non-burnable fraction, metals and glass, will reduce heavy metal concentrations in the ash and air emissions. In addition, yard waste removed will reduce nitrous oxide emissions. Combustion efficiencies will also increase with the removal of the non-burn fraction. In Greater Minnesota waste-to-energy systems were installed without significant integration of the other waste management techniques for many reasons including:

* State financial support focused on high capital cost technologies rather than assisting the low capital investment options of waste reduction, recycling and yard waste composting;
* Limited budgets and human resources encouraged counties to focus on a single option rather than an integrated approach;
* Waste-to-energy does not require much effort on the part of the public to change disposal or buying practices;
* Waste-to-energy systems are more easily designed and implemented than systems dependent on behavioral changes;

* Waste-to-energy appears more reliable because of its functional history and because its success does not depend on market fluctuations for recycled materials;
* Yard waste composting and recycling appear to compete with waste-to-energy systems rather than complement them due to contracts that are based on minimum tonnage requirements;
* State failure to provide leadership in recycling reduced its importance as an option and priority; and
* Less capital intensive waste management options, such as recycling, may not be encouraged by consultants whose fees are based on total project costs.

Recent legislation in several states has taken a more aggressive approach to the integration of solid waste management alternatives. For example, New Jersey's Mandatory Recycling Act established a 25 percent recycling goal to be achieved by 1990. Waste-to-energy facility permits in New Jersey require implementation of county planning goals and specific recyclables are not allowed on waste-to-energy facility tipping floors. In Minnesota, the 1988 amendments to the Waste Management Act ban yard waste from Metropolitan Area land disposal and waste-to-energy facilities in 1990 and from Greater Minnesota facilities in 1992. The 1988 amendments also encourage an integrated approach to solid waste management by setting policy goals for the removal of noncombustibles, such as glass and metals prior to incineration. The MPCA is required to develop rules for the measurement of noncombustibles. The MPCA is to develop goals and timetables for the reduction of the noncombustible fraction and for the reduction in the toxicity of the ash. While goals and timetables are recognized as immediate needs, more research needs to be done to characterize municipal solid waste and to identify waste stream components which contribute to the toxicity of incinerator ash. Another alternative to be considered is a certificate of need process for waste-to-energy facilities, similar to the currently required certificate of need for land disposal facilities.

Although the quantity of waste that can be burned is not limited by statute, the Metropolitan Council and the MPCA have assigned planning goals for each waste management alternative. Metropolitan counties have a 1990 goal to achieve 16 per cent source separation, and 4 per cent waste reduction. The remaining 80 per cent of the waste stream in 1990 must be centrally processed (including MSW composting, waste-to-energy, and mechanical recycling) so that no unprocessed waste is being sent to landfills. Based on 1985 waste generation figures, the total permitted capacity in the Metropolitan Area would allow 72 per cent of the waste to be burned. Using 1987 Metropolitan Council waste generation estimates, the total permitted capacity will allow only 51 per cent of the waste generated in the Metropolitan Area to be burned. In developing these figures,

permitted capacity has been defined as the maximum amount of waste that a facility can burn and remain in compliance. Using its definition of capacity and its projections of waste quantities, The Metropolitan Council projects that by 1993, 58 per cent of the waste stream will be burned under the planned county systems.

For Greater Minnesota, the county planning rules establish a 25 percent goal for recycling, a 12 percent goal for yard waste composting and a 3 percent goal for reduction. The remaining 60 percent may be managed through resource recovery methods. Currently, there exists enough permitted capacity at waste-to-energy facilities to burn approximately 33 percent of the waste generated in Greater Minnesota. Existing waste-to-energy facilities are listed in Table XIII-1 and Map XIII- 1. Two existing facilities are permitted but not operational, a 1000 ton mass burn facility in Minneapolis (HERC), and a 1080 ton per day RDF facility in Elk River.

Regulatory and Permitting Issues

Regulation of waste-to-energy facilities, as with all waste management technologies, will need to adapt to the changing database so that environmental and public health risks are minimized. Although current research has led the MPCA to conclude that a properly designed and operated facility, including air pollution control equipment, can sufficiently protect human health and the environment, the technology is not risk free. The uncertainties with this technology have resulted in a cautious regulatory approach.

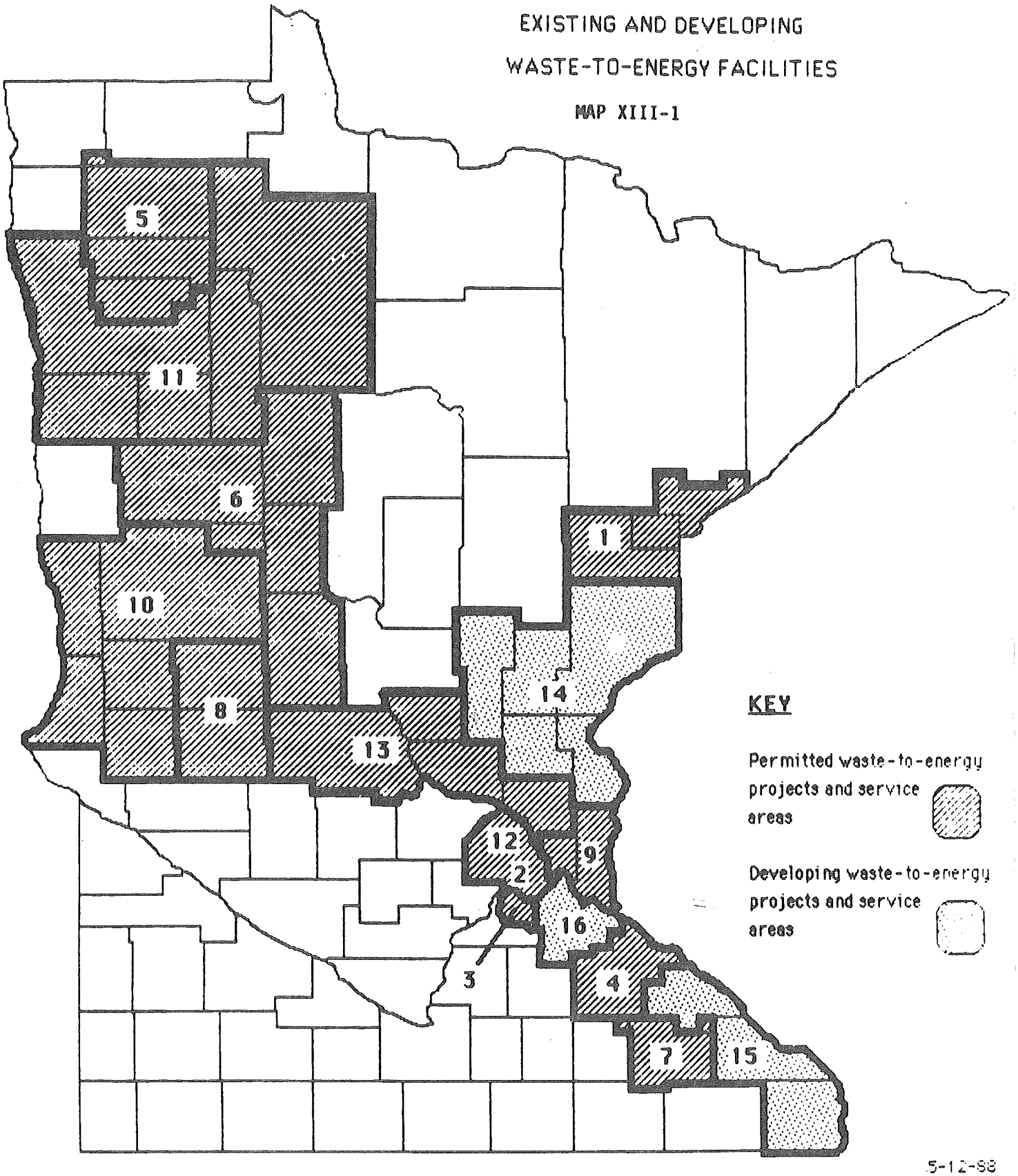
The state recognizes that waste-to-energy facilities can be part of an integrated and balanced solid waste management system. Permitting of waste-to-energy facilities began in 1979. Since 1979, the MPCA has permitted 12 waste-to-energy facilities. The permits were based on current information as existing state and federal rules were outdated and the technological database for new rules was inadequate. However, research in this area has been accelerated because of the number of projects not only in Minnesota but elsewhere in the United States, Canada, Europe, and Japan. Permit-by-permit development of standards applicable to all facilities is an inefficient manner with which to establish statewide policy. Therefore, the MPCA has initiated rulemaking for mixed municipal solid waste incineration and for ash management.

Air emissions and ash management are only two of the many issues facing state and federal policymakers. The following lists highlight the major issues facing policymakers. It should be noted that the federal and state issues overlap in some areas.

STATE of MINNESOTA

EXISTING AND DEVELOPING WASTE-TO-ENERGY FACILITIES

MAP XIII-1



MAP KEY

	PROJECT	SERVICE AREA FOR SOLID WASTE MANAGEMENT
1.	WLSSD/Duluth	WLSSD
2.	Reuter Incorporated/Eden Prairie	Part of Hennepin County
3.	Richard's Oil/Shakopee	Hennepin County and Savage
4.	City of Red Wing	Goodhue County
5.	Pennington County/Thief River Falls	Pennington, Red Lake, part of Kittson Counties
6.	Quadrant, Incorporated/Perham	Becker, Todd, Wadena, part of Hubbard and Ottertail Counties.
7.	Olmsted/Rochester	Olmsted, parts of Wabasha and Dodge Counties
8.	Pope-Douglas/Alexandria	Pope, Douglas Counties
9.	NSP/Ramsey-Washington	Ramsey and Washington Counties
10.	Fergus Falls	Ottertail, Wilkin, Traverse, Stevens, Grant, and Todd Counties
11.	Polk County/Fosston	Polk, Beltrami, Clearwater, Mahnomen, and Norman Counties
12.	Hennepin County/Minneapolis	Hennepin County
13.	UPA/Elk River	Anoka, Sherburne, Stearns, Benton Counties
14.	East Central Solid Waste Commission	Mille Lacs, Chisago, Isanti, Kanabec, Pine Counties
15.	Winona	Winona, Houston, Wabasha Counties
16.	Dakota	Dakota County

TABLE XIII-1
GENERAL DESCRIPTIONS OF EXISTING
WASTE-TO-ENERGY FACILITIES

Name/ Location	Owner/ Operator	Facility Type	Capacity: TPD Design/ Operating/Permitted	Market	Service Area For Solid Waste Management
WLSSD/Duluth	WLSSD	RDF	400/200/150	WLSSD Wastewater Plant; Co-incineration	WLSSD
Richard's Oil/ Savage	Richard's Asphalt	Modular	80/63/75	Richard's Oil; steam	Hennepin County, part of Savage
City of Red Wing/ Red Wing	City	Modular	72/96/90	S.B. Foot Tannery; steam	Red Wing and outlying areas
NSP/ Ramsey-Washington Counties[1]	NSP	RDF	1000/900/900	NSP (Mankato, Red Wing)	Ramsey and Washington Counties
Quadrant/ Perham	Quadrant	Modular	80/120/80	Land-O-Lakes, Tuffy's	All of Todd, Wadena, part of Hubbard and Otter Tail Counties
Olmsted County/ Rochester	Olmsted County	Mass burn	200/180/200	Olmsted Community Hospital; steam, electricity	All of Olmsted, Dodge, 5 TPD from both Goodhue and Wabasha Counties
Pope-Douglas/ Alexandria	Pope 25%, Douglas 75%/ Joint Powers Board	Modular	80/42-60/80	3M plant and Douglas County Hospital; steam	Pope and Douglas Counties
City of Fergus Falls/ Fergus Falls	City	Modular	94/shakedown/94	State Hospital; steam	Otter Tail, Wilkin, Traverse, Stevens, Grant, and Todd Counties
Polk County/ Fosston	Polk County	Modular	103/?/103	Land-O-Lakes; steam	Polk, Beltrami, Clearwater, Mahnomen, and Norman Counties
Reuter, Inc./ Eden Prairie	Reuter	RDF	400/200/400	Undetermined; None permitted	Parts of Hennepin County
Pennington County/ Thief River Falls	Pennington County/ Future Fuel	RDF	55/?/55	Undetermined; None permitted	Pennington, and parts of Marshall County.

[1]RDF is processed at the Newport facility and burned at Mankato and Red Wing NSP facilities. The permitted capacity at Mankato is 850 TPD and at Red Wing is 960 TPD; each has a separate permit.

State Issues

* Retrofitting facilities to meet new standards (e.g., dry scrubbers/bag houses);
* Emission standards;
* Health risk assessments;
* Ash testing requirements; and
* Ash disposal requirements.

National Issues

* Limits on the use of toxic metals by industry;
* Limits on the production of plastics by industry;
* Federal performance standards for incinerators;
* Ash classification;
* Ash testing requirements; and
* Ash disposal requirements.

Environmental and Public Health Issues

Municipal solid waste contains many sources of metals and organic precursors which result in the formation of pollutants during incineration that may be toxic or carcinogenic. Pollution control measures limit emissions to acceptable levels. Pollutants are classified as "criteria pollutants" for which emission and National Ambient Air Quality Standards (NAAQS) exist, and "non-criteria pollutants" for which there are no standards, but which may be limited by permit requirements.

Criteria pollutants for which NAAQS have been set are listed below:

* Suspended particulate matter less than 10 microns
* Sulfur dioxide
* Carbon monoxide
* Nitrogen dioxide
* Ozone
* Lead

All twelve permitted facilities in Minnesota are designed to have removal efficiencies more stringent than NAAQS limits.

Health effects associated with criteria pollutants include respiratory disease, reduced lung capacity, irritation of the respiratory tract, and cardiovascular stress. Of the criteria pollutants, lead represents the biggest concern in terms of health effects. The effects of lead poisoning on red blood cell formation, resulting in anemia, are well documented. Lead emissions can be limited by controlling the waste stream. Used lead acid batteries and some printing inks and pigments are major sources of lead in MSW. Removing these materials from the MSW feedstock may improve emissions. Effective particulate removal equipment can also limit lead emissions. However, this increases

the lead content of the incinerator ash. Therefore, it is preferable to remove materials containing lead from the MSW feedstock.

Other criteria pollutants, including sulfur dioxide, nitrogen dioxide, and carbon monoxide receive less attention than most other known pollutants. This is because studies have shown that emissions of these gases from MSW incineration can be limited to a level equal to or below levels experienced when burning coal or other fossil fuels.

Non-criteria pollutants are pollutants for which emission and air standards have not been set, and include the following:

Organics: dioxins and furans, polychlorinated biphenyls (PCB's), polynuclear aromatic hydrocarbons (PAH's), hexachlorobenzene, benzene, formaldehyde.

Metals: cadmium, chromium, nickel, arsenic, mercury, beryllium, selenium.

Acid Gases: hydrochloric (HCL), hydrofluoric (HF), nitric, sulfuric.

Although no NAAQS or MPCA ambient air quality standards exist for these pollutants, the MPCA limits emissions through permit requirements. Non-criteria pollutant limits are based on the results of the Environmental Impact Statement (EIS).

Of non-criteria pollutants, dioxins and furans have received the most attention. Dioxins and furans are the least understood and are often considered the most toxic pollutants. Formation of dioxins and furans is thought to occur after the combustion process during the cooling of furnace gases when complex organic compounds react with chlorine to form very stable chlorinated ring compounds. The key to limiting dioxin and other organic emissions is to destroy their precursors through adequate retention time, temperature, and turbulence in the combustion chamber. Removing the sources of these precursors in the waste stream through source separation, may be impossible because of the widespread use of chlorine and the many sources of complex organics.

Prior to receiving a facility permit, an Environmental Impact Statement (EIS) must be prepared and reviewed. The EIS documents are taken into consideration when developing permit requirements. The EIS addresses the effects the facility may have on environmental and public health. Part of the EIS is a health risk assessment, which determines whether the facility meets the acceptable health risk level established by the Minnesota Department of Health (MDH). The MDH has stated that a project increasing risk to the most exposed individuals by less than one in one hundred thousand (10^{-5}) is considered an acceptable health risk. If more than one carcinogenic pollutant is involved in the health risk assessment, the risk from each pollutant is added to

determine overall cancer risk. An alternative to requiring the facility to meet acceptable risk levels is to require the Best Available Control Technology (BACT). However, it is unlikely that the MPCA would permit a facility if the health risk significantly exceeded the MDH requirement.

Because the actual risk from many of these pollutants, especially dioxins and furans, is not completely understood, many of the decisions made at each point in a health risk assessment include some amount of uncertainty. As a result, the MPCA responds to conflicting or inadequate data by choosing the most environmentally conservative value for which there is scientific validity. The resulting health risk values can therefore be considered the "worst-case scenario."

Technology Description

The three major types of waste-to-energy facilities are furnace mass burn, modular mass burn, and refuse-derived fuel. Furnace mass burn facilities incinerate unprocessed mixed municipal solid waste. Modular mass burn facilities are factory built facilities that also incinerate unprocessed mixed municipal solid waste. Refuse-derived fuel facilities incinerate processed mixed municipal solid waste in the form of fluff or densified pellets. Each type of facility has particular concerns associated with it. For instance, it may be difficult to maintain combustion efficiency at a mass burn facility due to a variety of factors including the amount of noncombustibles present in a normal load of waste. By complementing the mass burn facility with a recycling program, the noncombustibles can be removed prior to incineration, resulting in a more efficient combustion process and a decrease in the level of toxics in the air emissions and resulting ash volume.

Air emissions can be controlled through proper operation, and pollution control equipment. The waste-to-energy facilities in Minnesota are equipped with one or more of the following types of pollution control equipment.

1. Electrostatic Precipitators are the most widely used. This type of pollution control equipment removes metals and some organic pollutants that adsorb to the surface of particles in the emissions. Dioxins, furans, gaseous metals and other gaseous pollutants are not removed by an electrostatic precipitator.

2. Venturi (Wet Scrubbers) and Packed Towers are designed to remove both particulate and gaseous pollutants, including dioxins and furans. The major disadvantage with these systems is that the large amount of liquid used causes equipment corrosion and liquid disposal problems.

3. Dry Scrubber/Fabric Filter systems are considered state-of-the-art in pollution control equipment. These systems remove particulate and gaseous pollutants, including dioxins and furans, at a very high removal efficiencies.

Table XIII-2 indicates the burn technology and pollution control equipment associated with each permitted waste-to-energy facility in Minnesota.

TABLE XIII-2
POLLUTION CONTROL EQUIPMENT AT PERMITTED FACILITIES

Facility Name	Technology	Pollution Control
WLSSD	Refuse-derived Fuel	Wet Scrubber
Richard's Oil	Modular Mass Burn	Electrostatic Precipitator
City of Red Wing	Modular Mass Burn	Electrostatic Precipitator
Quadrant	Modular Mass Burn	Electrostatic Precipitator
Olmsted	Furnace Mass Burn	Electrostatic Precipitator
Pope-Douglas	Modular Mass Burn	Electrostatic Precipitator
Fergus Falls	Modular Mass Burn	Wet Scrubber
Polk County	Modular Mass Burn	Electrostatic Precipitator
Hennepin County	Furnace Mass Burn	Dry Scrubber/Fabric Filter
United Power As.	Refuse-derived Fuel	Dry Scrubber
NSP Red Wing	Refuse-derived Fuel	Electrostatic Precipitator
NSP Mankato	Refuse-derived Fuel	Electrostatic Precipitator

The MPCA is currently studying emissions removal efficiencies at facilities having wet scrubbers and electrostatic precipitators to determine if retrofitting with dry scrubbers is necessary. A cost/benefit analysis, which considers lower health risks achieved with a dry scrubber system, will be part of this study. Pollutants in the emissions are classified as criteria pollutants for which standards exist and non-criteria pollutants for which no standards exist. Criteria pollutants include suspended particulate matter less than 10 microns in size, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, lead, hydrocarbons and hydrogen sulfide. Non-criteria pollutants include dioxins and furans, polynuclear aromatic hydrocarbons, metals (except lead) and acid gases. Many of these pollutants have known health risks associated with them. Most cause respiratory or organ dysfunctions or are carcinogenic at high levels. It is uncertain as to whether a significant risk exists from low level exposure to emissions from waste-to-energy facilities.

Air emissions are only one route of exposure to pollutants from waste-to-energy facilities. The other main route of exposure is

the ingestion of drinking water that has been contaminated by leachate from ash disposal sites. Residues collected from pollution control equipment are called fly ash and are often combined with bottom ash. Although the main component of ash is silicon oxide, or glass, additional components within the ash matrix include metals, dioxins, furans, polychlorinated biphenyls, chloride ions, sulfate ions and other inorganic and organic compounds. Of these constituents, dioxins, furans, metals, and polychlorinated biphenyls represent the greatest concern in terms of environmental and health risks. Therefore, any health risk assessment must consider multiple routes of exposure.

Economic Issues

The economics of constructing and operating waste-to-energy facilities are dependent on the technology used, the tonnage of waste processed, and the pollution control technologies required. The potential for increased air emission controls and land disposal standards will increase the cost of waste-to-energy facilities. Also impacting the cost-effectiveness are the markets available for the energy produced by the facility. The health risk and cost-effectiveness of a project are the important factors considered by decision makers. Table XIII-3 summarizes some waste-to-energy facility costs.

TABLE X111-3
WASTE-TO-ENERGY FACILITY COSTS

Facility	Size	Total Capital Costs	Tipping Fee	Annual Operating/ Maintenance Costs[1]	Cost/Ton
Pope-Douglas	72 TPD	$ 6.55 million	$28	$ 632,000	$50.00
Fosston	100 TPD	$ 6.98 million	$45	$ 1,116,840[3]	NA[2]
City of Red Wing	72 TPD	$ 3.0 million	$25	$ 500,000	$19.72
Quadrant	80 TPD	$ 7.0 million	$30	$ 800,000	$24.00
NSP-Ramsey/ Washington	900 TPD	$30.0 million	$27.67	proprietary	$35.50
Olmsted	200 TPD	$34.8 million	$58/ton[4]	$ 2,463,145	$76.73/ton

1 Does not include residual disposal costs.
2 Information not available.
3 Projected.
4 A 10% surcharge will be added to update recycling, household hazardous waste, and yard waste composting programs. Tipping fee will be $63.80.
5 With debt service, and projected received tonnage of 65,700 tons per year.

Note: In addition, many counties charge a yearly household or business service fee that covers all solid waste costs, from facility operations and maintenance to recycling (see chapter on costs). They range from $14.00/yr. (Ramsey County) to $80.00/yr. (Polk County).

CHAPTER XIV: LAND DISPOSAL

Introduction

Until the mid to late 1970's, the most accepted solid waste management practice was land disposal; first in open dumps, and later in sanitary landfills. The status quo changed, nationally because of a shortage of land disposal capacity and determined ground water impacts, and in Minnesota because of an additional interest in developing technologies that recovered resources. Diminishing land disposal capacity has created a crisis situation in densely populated areas. In these areas, the pressure to consider alternatives to land disposal is much greater than in most of Greater Minnesota. To avoid a crisis situation, Minnesota must regard remaining capacity as a precious commodity.

In Minnesota, policy makers realized that putting all wastes into a landfill was not the best long-term management strategy. Thus, the Waste Management Act of 1980 placed a high priority on waste reduction, recycling, and resource recovery, with land disposal being regarded as an undesirable option. The county solid waste planning rules, adopted in 1986, supported this policy by establishing a hierarchy that lists land disposal as the least desirable option. This hierarchy does not recognize technological advances in land disposal practices and regional differences between land availability in Greater Minnesota versus the Metropolitan Area. Although existing land disposal facilities may be reaching permitted capacity, in many areas of the state, especially in less densely populated areas, the inability to site new land disposal facilities is not limited by land availability. In essence, Minnesota's capacity shortage is limited to diminishing permitted capacity at existing sites, rather than a lack of land available to site new facilities, which is the focus of the national crisis.

Recognizing both the need for new land disposal facilities and the risks associated with any facility, solid waste managers and policy makers must continue to support the importance of reducing indiscriminate disposal; that is, waste reduction and recycling must be maximized to reduce the need for waste-to-energy, compost, and land disposal facilities.

History of Policy Regarding Land Disposal

Improper past disposal practices resulted in adverse environmental impacts. Documentation and recognition of these impacts encouraged the development of state policies to limit land disposal and minimize impacts. Prior to 1970, site selection was not based on environmental concerns. Control mechanisms for preventing ground water contamination were not

understood. Thus, facility standards were oriented to the prevention of nuisance conditions.

The concept of sanitary landfills was introduced by the EPA in 1972. A guidance manual, titled "Sanitary Landfill Design and Operation," provided recommended land disposal practices to minimize environmental impacts. Many of these recommendations were incorporated into the MPCA's 1973 revised rules, such as:

* A minimum 5-ft. separation distance to ground water;
* Mandatory ground water and gas monitoring;
* Stricter control on wastes accepted at the facility;
* A hydrogeologic study; and
* Closure requirements

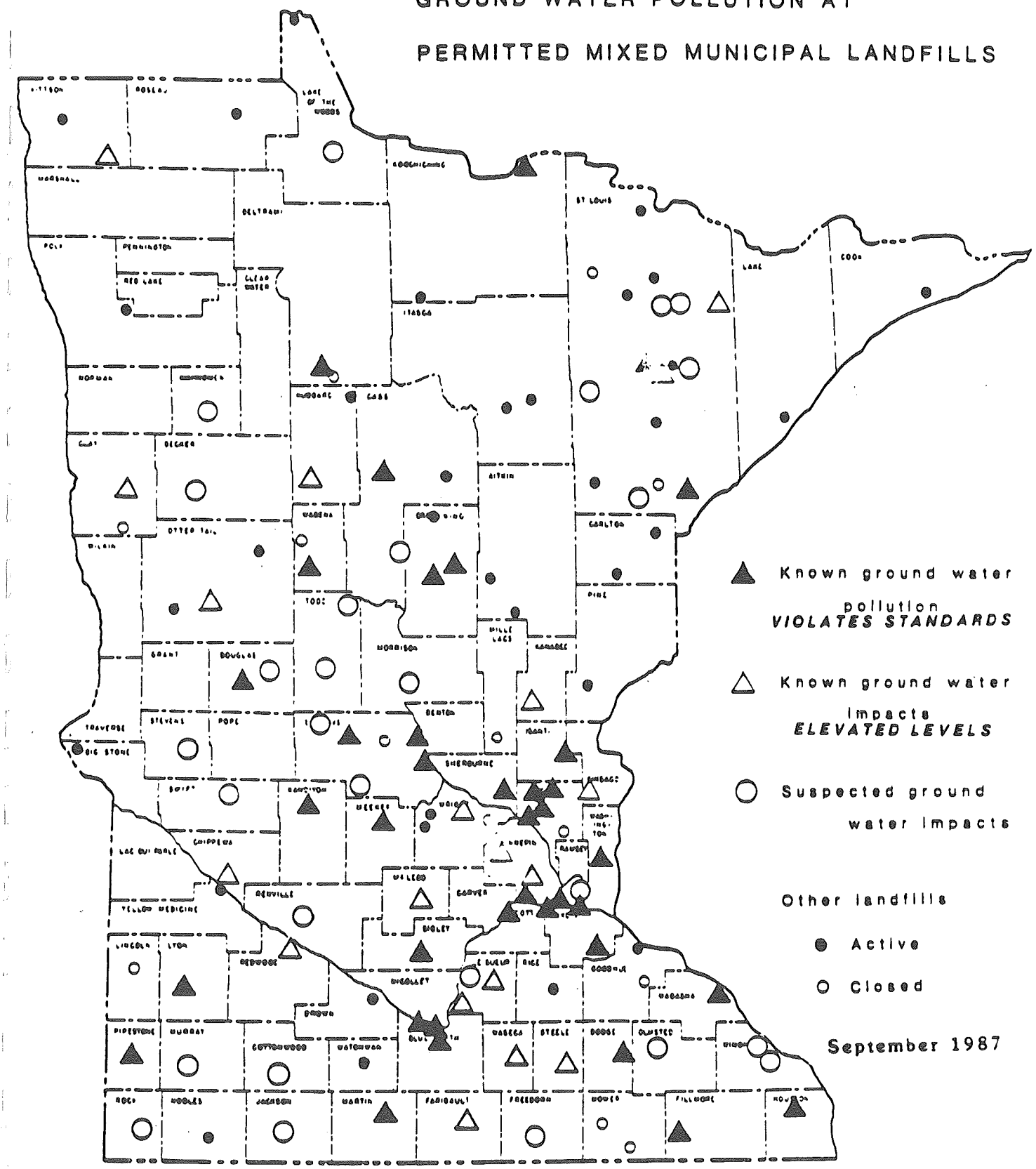
The early MPCA efforts were focused on maintaining good operations at sanitary landfills and closing open dumps. Of the original 1,500 open dumps in Minnesota, all but eight have been closed or upgraded to permitted facilities. One of the important changes in upgraded facilities was the installation of ground water monitoring systems. However, many of these early attempts at monitoring ground water quality were inadequate by today's standards. Although the MPCA felt at least one upgradient and two downgradient wells provided adequate information, many sites only had one well, which may have been located as far away from the site as one mile.

In 1980, an open dump inventory required by the U.S. EPA was completed. The inventory listed 86 sites as being top priorities for pollution potential and 131 more sites as being high priorities. Volatile organic chemical testing of ground water began in 1980 and was completed in 1982. The sampling revealed that volatile organic chemicals were found in ground water at 60 of the 61 permitted mixed municipal solid waste land disposal facilities tested. Map XIV-1 shows the extent of known or suspected ground water pollution at permitted MSW land disposal facilities as of September 1987.

The growing awareness that land disposal facilities impacted ground water resulted in the MPCA initiating solid waste rule revisions and permit amendments. In 1981, the MPCA staff formulated position papers and began suggesting revisions to existing rules. These position papers formed the basis for rulemaking. Occurring at the same time, the permit upgrade process, which was based on a priority system, required changes in monitoring, facility design, closure and postclosure care, and financial assurance. In 1984, the Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act required the EPA to revise its solid waste criteria. The proposed criteria were published in the Federal Register in August of 1988.

MAP XIV-1

GROUND WATER POLLUTION AT PERMITTED MIXED MUNICIPAL LANDFILLS



The Waste Management Act of 1980 has been amended each year since its original enactment. The 1984 amendments required the MPCA to establish rules for closure, postclosure care, and contingency action. Financial assurance was also required of land disposal facilities. The 1984 amendments established the Metropolitan Landfill Contingency Action Fund. This fund is financed by a fee placed on waste delivered to mixed municipal solid waste land disposal facilities in the Metropolitan Area. The fund can be used to finance closure/postclosure care costs or contingency action costs at facilities closed for 20 years in compliance with MPCA rules. It may be appropriate for nonmetropolitan counties to establish similar mechanisms at operating facilities.

Two other important provisions of the 1984 amendments are the establishment of a requirement to certify the need for new land disposal capacity in Greater Minnesota and the establishment of a waste tire program. Waste tires were also banned from land disposal facilities after July 1, 1985.

The 1985 amendments prohibited the disposal of unprocessed mixed municipal solid waste in land disposal facilities after January 1, 1990, in the Metropolitan Area. In 1987, the disposal of lead acid batteries and used oil in a mixed municipal solid waste land disposal facility was banned after January 1, 1988.

The 1988 amendments included:

* Bans on the land disposal of yard waste in the Metropolitan Area after January 1, 1990, and statewide by January 1, 1992;
* Regulation of solid waste disposal fees; and
* Classification of incinerator ash as a special waste with requirements for the development of a permanent program.

Appropriate Measures to Minimize Impacts

All solid waste management technologies potentially threaten human health and the environment. Land disposal, because of its history of implementation and documentation of problems, can be regulated with specific protective measures. The technologies with a lesser history result in more cautious regulatory programs. The increasing technological data base provides a better understanding of the risks associated with each alternative. The recently adopted solid waste rules use a combination of performance and design standards to ensure that proper risk management is employed at solid waste management facilities.

To minimize the potential for future impacts, Minnesota's solid waste rules require the consideration of specific site criteria when choosing a land disposal site. Areas with a high probability of being impacted are prohibited. Such criteria include

floodplains, critical habitat, geologically sensitive areas, and unsuitable soil conditions. A less than optimal site is not excluded from consideration if it can be designed and engineered to compensate for site deficiencies.

Hydrogeologic studies are used to fully characterize subsurface soil conditions and ground water movement. This information is used to design the facility and establish a monitoring program. Ground water quality data collected during these studies becomes the basis for determining facility impacts.

In Minnesota, each facility owner is required to develop facility plans containing a program to manage solid waste in a manner protective of public health and the environment. Facility plans include detailed descriptions of programs that address:

* Industrial solid waste management;
* Employee training;
* Quality assurance/quality control;
* Site security;
* Site inspection schedules;
* Water quality protection;
* Run-off/run-on control;
* Hazard prevention;
* Contingency action planning;
* Traffic management;
* Closure and postclosure care; and
* Financial assurance.

Specific design features needed to minimize potential environmental impacts include liners, leachate collection and management, methane gas control, and surface water controls.

Permits are the enforcement document used to ensure that facility design and operation programs are suitable to protect the environment. Permits are issued for only five-year terms to allow for timely upgrading of facilities in response to new information and technology. Permit conditions will change as technology advances.

Facility owners are required to maintain operations consistent with the design and construction programs. Good operation is the key to maintaining the benefits achieved in careful design and construction of the facility.

The following operational controls are required in Minnesota to ensure the environmental integrity of the site:

* Inspection on a regular basis of facility design features;
* Implementation of waste handling procedures;

* Personnel training;
* Develop industrial solid waste management programs;
* Air and water sampling of environmental media;
* Certification of operators;and
* Maintenance and operation records.

Monitoring is a means by which a facility is determined to be in compliance with the rules. Monitoring requirements are site-specific so local conditions are considered. The rules for solid waste require monitoring of ground water, leachate, and gas.

Monitoring results provide little information on impacts unless they can be compared to an established standard. Standards set limits for environmental quality beyond which permittees must take corrective actions. Standards are set for gas concentration and ground and surface water quality.

Ground water standards are established for specific substances. These substances are commonly found in leachate. The standards are based on available information about the health effect of particular substances. The standards must be met at a compliance boundary surrounding the waste area. This allows for the implementation of corrective action before pollutants move off-site.

Gas concentration standards apply within facility structures and at the property boundary. These standards are established for public safety.

Facility owners and operators of land disposal sites are required to demonstrate and maintain financial resources to properly close, take corrective actions, and maintain the site after closure. The amount of financial assurance needed is individualized to specific site conditions. On-site engineering studies will determine the level of cost to be covered. Financial assurance instruments considered acceptable are:

* Trust funds;
* Joint funds;
* Municipal-controlled funds;
* Financial-based surety bonds;
* Performance-based surety bonds;
* Letters of credit; and
* Proof of ability to self-insure.

These mechanisms apply to operating facilities and will ensure that financial resources will be available for future needs. Mechanisms need to be developed to provide funding for proper closure, post-closure, and remedial action at closed and abandoned facilities. With the exception of the length of post-closure care (30 years versus 20 years), the provisions contained in facility permits and the solid waste rules are consistent with

federal criteria and will result in state-of-the-art land disposal facilities.

Environmental and Public Health Issues

Land disposal facilities that are properly sited, designed, and operated minimize surface water, ground water, and air quality impacts and prevent conditions conducive to transmittal of disease. These environmental concerns can become public health concerns. Environmental impacts have been documented at land disposal facilities. Although health impacts from past exposure to pollutant releases at solid waste land disposal facilities have not been documented, recently completed health risk assessments do indicate that solid waste land disposal facilities do present potential risks to human health.

Surface and ground waters are impacted by leachate. Leachate is the liquid generated by moisture moving through solid waste. As the moisture moves it dissolves some waste and picks up pollutants generated from waste decomposition. These pollutants include metals and volatile organic chemicals, which can be toxic to humans at certain levels. The amount and type of leachate generated depends on the facility design and waste deposited in the facility. The ability to limit ground water and surface water impacts is dependent, among other things, on a liner/leachate collection system. Most existing land disposal facilities do not have leachate collection systems. All new mixed municipal solid waste land disposal areas and new fill areas at existing facilities will be designed and constructed with liners and leachate collection systems. The leachate collected will require on site treatment or treatment at a municipal waste water treatment facility. Communities which receive grants for waste water treatment facilities should be required to accept and treat this waste stream.

The rate, direction, and extent of groundwater movement depends upon the hydrogeologic characteristics of the site. Public health is threatened when drinking water supplies are impacted. Monitoring provides for early detection and correction before human health is put at risk. Surface water is impacted when leachate or polluted ground water flows into rivers and lakes. (Surface water has some self-purification abilities because the surface water-air interface allows for some volatization of organics.) However, because lakes are slow moving water bodies nutrients may form algal blooms and metals will accumulate in lake sediments. The result is oxygen depletion in the lake and a concentration of the pollutants.

Air quality is impacted by gas produced from the decomposing waste, odors, and dust. Most of the gas produced is either methane or carbon dioxide; however, vinyl chloride has been measured at the surface of some land disposal facilities. The

accumulation of methane gas in a structure can pose a serious fire or explosion hazard. Methane can also kill vegetation by blocking the passage of oxygen into plant roots.

Land disposal sites must be evaluated as to the need for corrective action. Priority sites, those sites having the greatest potential for impacts, are placed on the state and federal Superfund lists. Follow-up investigations provide information on the need for corrective action.

Current Status

Minnesota has permitted 132 land disposal facilities. Of these 132 facilities, 91 remain open and are operating. (See Map XIV-2.) The other 41 facilities are in some sequence of closing. Currently, there are 51 mixed municipal solid waste land disposal facilities on the state Permanent List of Priorities. There are currently eight remaining open dumps, all scheduled to close by 1989.

Information regarding remaining capacity at the 91 operating facilities is incomplete and the most recent assessment was based on 1985 data. In addition to being outdated, the existing information is based on reported volumes received rather than on actual measured capacity of the fill areas. Using incoming waste volume data to determine remaining capacity is inaccurate because:

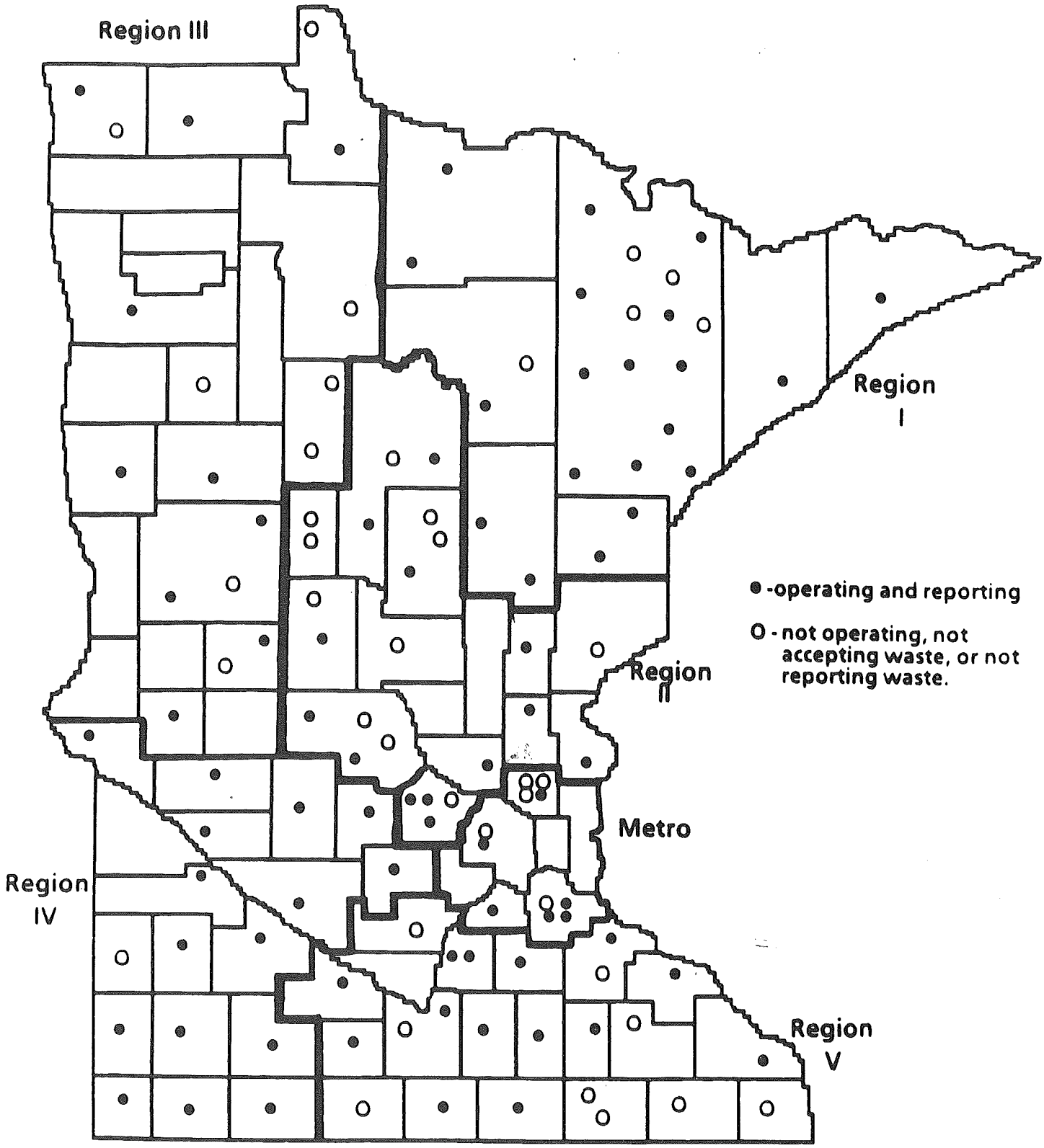
* Lack of reliable methods to determine volumes;
* In-place compaction may permit greater volume in given space.
* Decomposition and settlement variability; and
* Variability of waste generated and received over time.

The lack of data results in the inability to make good assessments regarding remaining land disposal capacity. This data is crucial to the planning and implementation of an integrated solid waste management system. The lack of reliable data has been recognized and addressed in the MPCA's new solid waste rules. Under the rules, facility owners will be required to conduct an annual survey of fill areas and assess the remaining capacity. This information will allow development of better timelines for planning new management facilities and management alternatives to land disposal.

Under the rules, more defined standards will be placed on facility owners such as ground water monitoring, liners, leachate collection and treatment, and closure standards. These changes will increase the cost of land disposal. During rule development the MPCA has prepared cost estimates for ideal-typical land disposal facilities. The cost estimates are not representative of any one facility but represent generalized categories of

MAP XIV-2

DISTRIBUTION OF PERMITTED MSW LANDFILLS BY MPCA REGION



facilities. The unit costs were derived from information submitted by local contractors, facility owners, and consultants based on actual Minnesota conditions. The cost estimates show how specific factors such as remaining capacity, volume of waste received, location, etc. can impact the actual costs experienced by a facility owner. In addition to increased costs, land disposal facilities are currently having a difficult time locating waste water treatment facilities which are willing to accept the leachate that is generated.

The main effects of the solid waste rules are to raise the cost of land disposal and to reduce the environmental risk associated with this management alternative. However, this trend is not limited to Minnesota. The National Solid Waste Management Association has conducted national surveys of waste disposal tipping fees since 1982. The results of the national surveys show a clear trend to rising costs. In 1982 the average national tipping fee was $10.80 per ton, while in 1986 the average was $13.43 per ton. Tipping fees in Greater Minnesota fall into the lower range of national estimates. In 1986, Metropolitan Area tipping fees averaged $22 per ton.

Surcharges or other fees will also raise the tipping fee. However, this money may not always be used to fund activities at the land disposal facility. For example, part of the mandatory surcharge in the Metropolitan Area is used to fund grant programs designed to abate land disposal. The total collected through surcharges in the Metropolitan Area in 1987 was approximately $6 million while Greater Minnesota collected about $1.5 million.

Facility users will have to pay more for waste disposal services as permittees increase costs to offset new design and construction costs. Charge systems vary throughout the state. Most facilities charge a tipping fee while some users are assessed a property tax or levy to recover costs, and a few are charged nothing. Subsidized facilities are often underfunded due to the restraints on a local community's taxing ability.

The mixed financial management structure means localized financial impacts will vary throughout the state. Facility users in many areas will pay for all costs. However, it is unlikely that those who send the most waste will incur proportionate cost increases. This condition exists because few waste haulers base residential charges on unit costs. Most service charges are based on average costs.

Local government regulations further complicate matters. Few municipalities regulate collection service rates, although some number control disposal facility rates. Unfortunately, it appears land disposal rate increases offer windfall opportunities that some waste haulers cannot resist.

The vagaries of financial management in the solid waste sector make precise estimates of local impacts impossible. The only precise answer to the question is "What does land disposal cost", is "It depends" on:

* Where you live;
* What you pay now;
* Where the disposal facility is located;
* How long has the facility been operating;
* How long will the facility continue operating;
* The extent of local regulation;
* The method used to charge for increased costs; and
* When financial planning for future management needs began.

The Appropriate Role of Land Disposal

Understanding the costs and risks associated with land disposal of solid waste, what is the appropriate role of land disposal? The Waste Management Act of 1980 included as a goal, "the reduction in indiscriminate dependence on disposal of waste." The county planning rules established land disposal as the least desirable solid waste management alternative. These goals were based on the ground water impacts at existing facilities and the data base that existed regarding risks of other management alternatives.

Since this time, the increasing technological data base has been better defined and the impacts associated with waste-to-energy facilities better understood. The health risks associated with compost facilities have yet to be defined. In some cases, the additional pollution control equipment associated with waste-to-energy facilities, because of the new health risk assessments, have made these projects cost prohibitive. These facts, along with new design standards for land disposal facilities, have reduced some of the concerns associated with land disposal. However, there is no currently applicable model that is being used to determine health risk assessments for land disposal facilities. Additionally, land disposal is recognized as an integral part of any solid waste management system, as ash, rejected materials, and MSW generated during the non-operational period (down time) of the alternative technologies will require management. While there is no question that waste reduction and recycling should continue to be regarded as top priorities, the choice regarding the best alternative to manage the remaining portion has become increasingly difficult.

The awareness that there are risks associated with all waste management techniques has been recognized by federal policy makers. The EPA's current interpretation of their hierarchy reflects the diminishing distinction in the level of risks associated with the various waste management technologies, and

suggests that the selection of the best alternative should be dependent on local conditions.

To remain progressive in solid waste management technologies, Minnesota policy makers need to give consideration to the increasing database and to the direction or trends in federal policy. This will require continual evaluation of solid waste management options and decisions must be based on regional conditions. Health risk assessments should be developed and used for all waste management alternatives as part of this site specific evaluation. Solid waste management decisions which are based on regional and on site specific conditions require policies that are capable of incorporating technological change. This is not to say that state-of-the-art land disposal should be regarded as technologically superior to waste-to-energy, but that in certain situations waste-to-energy may not be the appropriate waste management alternative. A rigid hierarchy does not support this concept. As an alternative to maintaining this hierarchy, the state should investigate and periodically reexamine its solid waste management policy.

APPENDIX A
SOLID WASTE POLICY REPORT JOINT BOARD COMMITTEE AND TASK FORCE MEMBERS

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SOLID WASTE POLICY REPORT TASK FORCE

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Gayle Peterson (Sierra Club Project Environment)	1313 - 5th St. SE Minneapolis, MN 55414	(612) 379-3856

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Tom Tellijohn (LeSueur)	P. O. Box 167 LeSueur, MN 56058	(612) 665-3096
Chris Kreger (Sherburne)	22460 Hwy 169 NW Elk River, MN 55330	(612) 441-2464
Dan Huschke (Douglas)	1601 County Rd. 22 Alexandria, MN 56308	(612) 763-6739

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Gene Mossing (Co-Chair) (Winona)	Winona County Courthouse 171 West 3rd Street Winona, MN 55987	(507) 457-6460
Dale Taubert (Pipestone)	County Courthouse Pipestone, MN 56164	(507) 825-4246

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Lilias Jones (League of Minnesota Cities)	Route #1 Kent, MN 56553	(218) 995-2526
Bob Roufs (Itasca County)	Box 197 Cohasset, MN 55721	(218) 327-2860

Legislative Liaison

Kim Austrian (Legislative Commission on Waste Management)	85 State Office Bldg. St. Paul, MN 55155	(612) 297-3604

MV/mlr
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STATUTORY POLICIES, GOALS, AND OBJECTIVES FOR SOLID WASTE MANAGEMENT IN MINNESOTA

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Pollution Control Agency Minn. Stat. § 116 (1986) (enacted 1969)	• "To meet the the variety and complexity of problems relating to water, air and land pollution in the areas of the state affected thereby, and to achieve a reasonable degree of purity of water, air and land resources of the state consistent with the maximum enjoyment and use thereof in furtherance of the welfare of the people of the state, it is in the public interest that there be established a pollution control agency." (116.01) • Promotion of solid waste disposal control; prevention and abatement of water, air, and land pollution; (116.07) • Recognize and take into consideration regional differences in adopting standards; (116.07) • Give due consideration to business impact and other economic factors and to tax burdens on a municipality that may result from any action (116.07)	• Creation of MPCA. (116.01) • Adoption of standards, rules; permitting and enforcement activities; provision of public information. (116.07) • Long range plan and program and biennial report on progress in pollution and abatement control with recommendations (116.10) • Waste disposal facility operator and inspector training, certification and regulatory and enforcement technical and financial assistance programs. (116.41)
Minnesota Environmental Rights Laws Minn. Stat. § 116B (1986) (enacted 1971)	• "The legislature finds and declares that each person is entitled by right to the protection, preservation, and enhancement of air, water, land, and other natural resources located within the state and that each person has the responsibility to contribute to the protection, preservation, and enhancement thereof. The legislature further declares its policy to create and maintain within the state conditions under which human beings and nature can exist in productive harmony in order that present and future generations may enjoy clean air and water, productive land, and other natural resources with which this state has been endowed. Accordingly, it is in the public interest to provide an adequate civil remedy to protect air, water, land and other natural resources located within the state from pollution, impairment, or destruction." (116.01)	• Gives citizens and groups the right to undertake civil actions, to intervene in proceedings or judicial review for the protection of the air, water, land or other natural resources located within the state. (116B.03-.09)

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Environmental Quality Board Minn. Stat. § 116C (1986) (enacted 1973)	• "The legislature of the state of Minnesota finds that problems related to the environment often encompass the responsibilities of several state agencies and the solutions to these environmental problems require the interaction of these agencies. The legislature also finds that further debate concerning population, economic and technological growth should be encouraged so that the consequences and causes of alternative decisions can be better known and understood by the public and its government." (116C.01)	• Gives Environmental Quality Board power to investigate, review, and coordinate state activities which affect environmental quality in the state and which cross state departmental boundaries.
State Environmental Policy Act. Minn. Stat. § 116D (1986) (enacted 1973)	• The purposes of Laws 1973, chapter 412 are: (a) to declare a state policy that will encourage productive and enjoyable harmony between human beings and their environment; (b) to promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of human beings and (c) to enrich the understanding of the ecological systems and natural resources important to the state and to the nation. (116D.01) • Specifically, with respect to solid waste issues, the statute established the following policies: the reduction of wasteful practices which generate wastes; the minimization of wasteful and unnecessary depletion of non-renewable resources; encouraging extension of product lifetime, reducing unnecessary and wasteful materials practices and recycling materials to conserve both materials and energy; (116D.02)	• Mandates that state government and all departments and agencies of the state act to strengthen intergovernmental relationships, utilize interdisciplinary approaches, consider environmental amenities and values, recognize the world wide and long range character of environmental problems, undertake research and information gathering and dissemination (116D.03) • Mandate the preparation of an environmental impact statement whenever there is potential for significant environmental effects resulting from any major governmental action. (116D.04) • Mandates an annual report to the governor on environmental quality. • Mandates that the policies and goals set forth in the statute are supplementary to these set forth in existing authorizations of state agencies. (116.06)

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
State Environmental Policy Minn. Stat. § 116D (1986) (enacted 1973) continued	• No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct. (116D.04)	
Environmental Education Board Minn. Stat. § 116E (1986) (enacted 1973)	• It is the policy of the state of Minnesota to encourage development of life values and a style of living which fosters the constructive use, rather than exploitation of natural resources and the environment, and to promote coordination among various groups and institutions developing and distributing environmental education materials, including but not limited to formal and nonformal education, prekindergarten, kindergarten through grade twelve, post-secondary, vocational, college and adult education. It is in the public interest that there be established a state environmental education board and hereinafter described regional environmental education councils. (116E.01)	• Creates an environmental education board to be supervised by the commissioner of natural resources. The board is to plan for environmental education within the state; advise the legislature and governor, and prepare studies and reports. • Creates regional environmental education councils to be coordinated by the state board.

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Recycling of Solid Waste Minn. Stat. § 116F (1986) (enacted 1973)	• "The legislature seeks to encourage both the reduction of the amount and type of material entering the solid waste stream and the reuse and recycling of materials. Solid waste represents discarded material and energy resources, and it also represents an economic burden to the people of the state. The recycling of solid waste materials is one alternative for the conservation of material and energy resources, but it is also in the public interest to reduce the amount of materials requiring recycling or disposal. • The legislature also seeks to encourage the design and implementation of regional programs for materials conservation which take into account the variations in solid waste generation throughout the state. (116F.01)	• Authorizes public education programs, market development activities, studies of waste stream components, recommendations encouraging redesign and standardization of material configuration and composting assistance in development of resource recovery systems, and encouragement of the extension of useful product live and the reduction of both solid waste generation and management costs. • Mandates state advice, assistance, review, and reporting an order to develop packaging and containers consistent with the environmental policies of the state.
Waste Management Act of 1980 Minn. Stat. § 115A (1986) (enacted 1980)	• "It is the goal of sections 115A.01 to 115A.72 to improve waste management in the state to serve the following purposes: (a) Reduction in waste generated; (b) Separation and recovery of materials and energy from waste ; (c) Reduction in indiscriminate dependence on disposal of waste; (d) Coordination of solid waste management among political subdivisions; (e) Orderly and deliberate development and financial security of waste facilities including disposal facilities." (115A.02) • In developing comprehensive solid waste plans, counties are directed to: • Require the most feasible and prudent reduction of the need for land disposal of mixed municipal solid waste.	• Creates a Waste Management Board (115A.04) • Creates a Legislative Commission on Waste Management (115A.14) • Creates a State Government Resource Recovery Program to be administered by the commissioner of administration (115A.15) • Mandates the improved management of industrial wastes; authorizes grants for reduction and processing activities (115A.06; 115A.152; 115A.154; 115A.156; 115A.158) • Mandates the development and implementation of program of waste education (115A.072) • Mandates supplementary review procedure for the siting of certain solid waste facilities (115A.33) • Mandates a report on solid waste management policy excluding the metro area (115A.40)

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Waste Management Act of 1980 (continued)	• Encourage ownership and operation of solid waste facilities by private industry, to the extent practical and consistent with the achievement of other public policies. • Protect comparable public and private facilities already existing from displacement by publicly financed facilities unless the displacement is required to achieve the objectives stated in the plan. (115A.46) • In establishing a procedure for the creation of solid waste management districts, the legislature concluded that "the development of integrated and coordinated solid waste management systems is needed to manage properly the solid wastes generated in the state..." (115A.62)	• Mandates a technical assistance program to counties in preparing solid waste plans (115A.45) • Mandates market development and public procurement programs (115A.48) • Establishes programs to encourage and assist local units of government in the development of solid waste management projects (115A.49) • Establishes grant programs for waste reduction, separation, and processing projects. (115A.53-54)

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Waste Management Act of 1980 (continued)	• Prohibits the land disposal of waste tires after July 1, 1985. This does not prohibit the storage of unprocessed waste tires at a collection or processing facility. (115A.904) • Prohibits the disposal or placement of a lead acid battery in mixed municipal solid waste after January 1, 1988 (115A.915) • Prohibits the disposal of used oil in a solid waste facility or the placement of used oil in mixed municipal solid waste after January 1, 1988. (115A.916). • Prohibits the permitting of disposal capacity for mixed municipal solid waste in counties outside the Metro Area without a certificate of need based on the certification that there are no feasible and prudent alternatives that would minimize impact upon natural resources. Alternatives that are speculative or conjectural are not feasible and prudent. Economic considerations alone do not justify the certification of need or the rejection of alternatives. (115A.97) • Prohibits a publicly owned, operated, or supported resource recovery facility from accepting recyclable materials unless no other persons willing to accept the recyclable materials. (115A.95) • Requires State agencies who lease space for 30 days or more (of 5,000 square feet or more) to provide space for recyclable materials; and • Requires that suitable space be provided for the separation, collection and temporary storage of recyclable materials within or adjacent to new or remodeled structures of 1,000 square feet or more. Exempt are residential structures with less than 12 dwelling units.	• Established a procedure for the creation of solid waste management districts (115A.62) • Authorizes the designation of waste to resource recovery facilities. (115A.80) • Establishes a program for the management of waste tires in the state (115A.90) • Requires the issuance of a certificate of need for additional disposal capacity in counties outside the metro area. (115A.917) • Authorizes counties and cities and towns to impose a fee on disposal facilities with funds to be used for landfill abatement, costs of closure or post-closure care, response action, or for mitigating and compensating for adverse local effects of facilities (115A.918) • Authorizes cities, towns, or counties to organize collection (115A.94) • Mandates the establishment of a program to manage household hazardous wastes. (115A.96) • Requires placement of signs related to used oil and lead acid battery requirements.

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Waste Management Act of 1980 (continued)	• Changes the definition of "recyclable materials" to include materials that are mechanically separated in addition to source separated. States that refuse-derived fuel or other materials destroyed by incineration are not recyclable materials. • Specifies the responsibilities of the Legislative Commission on Waste Management (LCWM) including the oversight of the solid and hazardous waste management activities of the WMB, MPCA activities relating to State superfund, landfill contingency action fund, and water pollution control; and activities of the Metropolitan Council relating to metropolitan waste management. • Provides for market development grants for compost in addition to recyclable materials. • Requires that solid waste be managed to achieve to the maximum extent feasible a reduction of the toxicity and quantity of the ash and residuals. • Considers incinerator ash a special waste until the U.S. Environmental Protection Agency (EPA) establishes testing and disposal requirements, or the MPCA adopts rules, or June 30, 1990, whichever comes first; • Requires county solid waste plans that include incineration of solid waste to state how the county plans to meet above goals of reducing toxicity and quantity of incinerator ash and residuals; • Requires permit applications and renewals for solid waste incinerators to state how applicant will achieve the goals of reducing the toxicity and quantity of ash and residuals.	• Allows the WMB to make grants to recycling facilities only to the extent that the program is cost-effective in meeting recycling goals. • Requires the MPCA to adopt rules for the testing, management and disposal of incinerator ash, and to establish techniques to measure the noncombustible fraction of solid waste prior to the waste being incinerated or processed into refuse-derived fuel; • Requires the MPCA to establish a temporary program to test, monitor and store incinerator ash and provides for fly ash, bottom ash and combined ash to be tested separately. In addition, ash must be stored separately from solid waste; • Directs the WMB to develop goals and timetables to reduce the toxicity and quantity of incinerator ash, and report to the LCWM with recommendations for implementation of the goals and timetables. • Allows the WMB to develop guidelines for counties pertaining to above goals; • Allows the MPCA to develop guidelines for permit applicants pertaining to goals. • Allows WMB to make loans to businesses for purchase of used oil processing equipment and grants to counties for installing public used oil collection tanks.

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Waste Management Act of 1980 (continued)	• Bans yard waste from disposal in landfills or resource recovery facilities except for the purposes of composting in the metropolitan area after January 1, 1990 and outside the metropolitan area after January 1, 1992. • Prohibits disposing of used oil in or on the land unless approved by the MPCA. • Removes the county cap on waste disposal fees in the metropolitan area. • Increases city and town fee authority to 35 cents/cubic yard of waste from 25 cents/cubic yard of waste. • Establishes a study by the LCWM recommending a system to regulate solid waste disposal fees to be finalized by December 31, 1988. • Requires notice by the MPCA to local units of government where facility is located of granting a permit or of changes in solid waste disposal permits. If a local government unit requests a public meeting within 30 days after being notified, the MPCA must hold at least one public meeting in the area near the facility before granting or changing the permit. • Adds the chair of the WMB to the Environmental Quality Board. • Prohibits the sale or giving away to consumers in Minnesota a beverage packaged in a plastic can. A person who violates this law is guilty of a misdemeanor. • Prohibits the sale or giving away to consumers beverages or motor oil containers held together by nondegradable plastic. A person who violates this law is guilty of a misdemeanor. • Prohibits manufacturing or bringing into Minnesota for sale plastic containers that do not comply with adopted labeling rules.	• Requires metropolitan area disposal facilities to file with the MPCA their disposal fees and document support of those fees, the costs of operation and necessity of any fee increases. Until June 1, 1989, disposal fees in the metropolitan area may not be increased except to reflect increases in costs of operation. • Requires the WMB to adopt rules by March 31, 1989, requiring labeling of plastic containers with a capacity of 16 ounces or more to facilitate separation and recycling. The manufacturer of plastic containers, a person who places products in plastic containers and a person who sells products in plastic containers can choose an appropriate method of labeling the containers for type of plastic used. • Repeals the expiration date of the LCWM. • Requires the Metropolitan Council to estimate the available disposal capacity in the metropolitan area for solid waste and ash and describe strategy to make that capacity last until years 2000, 2005 and 2010.

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Waste Management Act of 1980 (continued)	• requires a person who sells automotive tires at retail to accept for recycling as many waste tires from each customer as he or she buys. • Makes changes to the metropolitan landfill siting process. • Makes a person who unlawfully deposits garbage, rubbish, offal or the body of a dead animal or other litter on shoreland areas adjacent to rivers or streams guilty of a misdemeanor. • Forgives a solid waste loan to Pennington County.	
Ban on Chlorofluorocarbon (CFC) Food Packaging MN Laws 1988, CH. 671	• Prohibits individuals, governmental units and vendors from using any of the listed CFC-produced packaging materials. A person who violates this law is subject to a civil penalty of up to $500 for each violation.	• Requires the MPCA to do a study on eliminating sources of CFC to be presented to the legislature by December 1, 1988 and • Requires the MPCA to develop rules to exempt CFC-process produced products where applicable.
Prohibition on Sale of Nonbiodegradable Plastic MN Laws 1988, CH. 688	• Defines nondegradable as not being decomposed by natural biological processes, including exposure to the sun within five years from the date of disposal; • Prohibits the use and sale after January 1, 1989 of nondegradable plastic beverage rings. A person who does not comply is guilty of a misdemeanor; • Prohibits public agencies after January 1, 1990 from purchasing nondegradable plastic trash bags or using such bags after January 1, 1991.	• Creates an advisory task force on biodegradable plastics which shall study the feasibility and consequences of requiring biodegradable consumer and industry products; and • Requires the task force to report its findings, along with any proposed legislation to the legislature by January 1, 1990, after which the task force expires.
Environmental Compensation and Liability Minn. Stat.§ 115B (1983)	• Primary goal is to enable the speediest and most effective cleanup of contaminated sites, and to clarify responsibility and liability with respect to those sites.	• Defined liability for response costs; • Defined liability for economic loss, death, personal injury, disease;

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STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Environmental Compensation and Liability Minn. Stat. § 115B (1983) (continued)		• Defined state response to releases of a hazardous substance; • Created the environmental response, compensation, and compliance fund; • Mandated a hazardous waste generator tax; • Created a hazardous substance injury compensation board;
County Solid Waste Management Act of 1971 Minn. Stat. § 400 (1986) (enacted 1971)	In order to protect the state's water, air and land resources so as to promote the public safety, health, welfare and productive capacity of its population, it is in the public interest that counties conduct solid waste management programs. (400.01)	• Authorizes all counties outside the Metro area to conduct solid waste management program; includes provisions relating to facility acquisition, construction and operation; inspection; development of resource recovery systems; service areas; revenue bonds; tax levies; disposal regulation; designation. (400)
Metro Area Solid Waste Comprehensive Planning Minn. Stat. § 473.149 (1986) (enacted 1975)	Subdivision 1. Policy plan; general requirements. The metropolitan council shall prepare and by resolution adopt as part of its development guide a long range policy plan for solid waste management in the metropolitan area. When adopted, the plan shall be followed in the metropolitan area. The plan shall address the state policies and purposes expressed in section 115A.02. The plan shall substantially conform to all policy statements, purposes, goals, standards, maps and plans in development guide sections and plans adopted by the council, provided that no land shall be thereby excluded from consideration as a solid waste facility site except land determined by the agency to be intrinsically	• Mandates the preparation and adoption of a long range policy plan for solid waste management in the Metropolitan area. • Requires a land disposal abatement plan. • Requires annual report on abatement to the legislature.

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Metro Area Solid Waste Comprehensive Planning (continued)	unsuitable for such use. The plan shall include goals and policies for solid waste management in the metropolitan area and, to the extent appropriate, statements and information similar to that required under section 473.146. The plan shall include criteria and standards for solid waste facilities and solid waste facility sites respecting the following matters; general location; capacity; operation; processing techniques; environmental impact; effect on existing, planned, or proposed collection services and waste facilities; and economic viability. The plan shall, to the extent practicable and consistent with the achievement of other public policies and purposes, encourage ownership and operation of solid waste facilities by private industry. For solid waste facilities owned or operated by public agencies or supported primarily by public funds or obligations issued by a public agency, the plan shall include additional criteria and standards to protect comparable private and public facilities already existing in the area from displacement unless the displacement is required in order to achieve the waste management objectives identified in the plan. In developing the plan the council shall consider the orderly and economic development, public and private, of the metropolitan area; the preservation and best and most economical use of land and water resources in the metropolitan area; the protection and enhancement of environmental quality; the conservation and reuse of resources and energy; the preservation and promotion of conditions conducive to efficient, competitive, and adaptable systems of waste management; and the orderly resolution of questions concerning changes in systems of waste management. Criteria and standards for solid waste facilities shall be consistent with rules adopted by the pollution control agency pursuant to chapter 116	

STATUTE	POLICIES, GOALS, AND OBJECTIVES	PROGRAMS
Metro Area Solid Waste Comprehensive Planning (continued)	and shall be at least as stringent as the guidelines,regulations, and standards of the federal environmental protection agency. ● The abatement plan must include specific and quantifiable objectives for abating to the greatest extent feasible and prudent the need for land disposal of mixed municipal solid waste and of specific components of the solid waste stream, either by type of waste or class of generator.	
Metropolitan Solid and Hazardous Waste Minn. stat. § 473.801 - § 473.840 (1986) (enacted 1975)	● County master plans must be consistent with the Metropolitan Council's policy plan.	● Counties are required to prepare and submit a county master plan; must include a land disposal abatement element. (473.803) ● Counties are authorized to conduct solid waste management programs. (473.811)
Metropolitan Landfill Abatement Act Minn. Stat. § 473.841 (1986) (enacted 1984)	● Purpose of the Landfill Abatement fund is to reduce to the greatest extent feasible and prudent the need for and practice of land disposal of mixed municipal solid waste in the metropolitan area (473.844) ● After January 1, 1990, waste disposal facilities located in the metropolitan area may not accept mixed municipal solid waste for disposal unless the waste has been transferred to the disposal facility from a resource recovery facility identified by the council. For purposes of this section, mixed municipal solid waste does not include street sweepings, construction debris, mining waste, foundry sand, and other materials, if they are not capable of being processed by resource recovery facility as determined by the council.	● Creates aLlandfill Abatement Fund (473.844) ● Creates a Metropolitan Landfill Contingency Action Fund. (473.845) ● Requires a report to the Legislature of the use of these funds (473.846
Potable Water Protection Policy Minn. Stat. § 115.063 (1986) (enacted 1987)	Prohibits the location, construction or operation of hazardous or radioactive waste depositories in any manner that can reasonably be expected to cause pollution of potable water.	

APPENDIX C

RECYCLING PROGRAMS IN GREATER MINNESOTA COUNTIES

This table presents a sampling of recycling programs in Greater Minnesota Counties.
The table was compiled from information in press clippings received through July 31, 1988.
Since only one source of information was used, some existing and/or planned programs have not been included.

COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
AITKIN	Aluminum cans, newspapers, glass, cardboard, brass and copper scrap, steel cans, batteries, lead, textiles, and plastic beverage bottles	Aitkin Recycling Center (buy-back)			Python's Aitkin Recycling	Public education	Aitkin
BECKER	Cans, glass, paper	Boxes and donation center		Recycling presentations in 3rd grade classrooms throughout county	DAC		Located in Detroit Lakes
	Newspaper		Monthly pick-up		Boy Scouts		Detroit Lakes area
	Aluminum	Buy-back			Charlie's Recycling	Pays for aluminum	Located near Detroit Lakes
BELTRAMI	Aluminum, glass, newspaper, cardboard, steel beverage cans	Buy-back, also donation at transfer station			Occupational Development Center (private, non-profit) with financial help from county and City of Bemidji	ODC pays for aluminum and steel beverage cans	located in Bemidji, available to Beltrami County

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BENTON	Aluminum, glass, newspapers				St. Cloud City Council	Lottery	St. Cloud
BIG STONE	Aluminum cans	Donation			Big Stone City	Proceeds for Centennial Celebration	Big Stone City
	Beverage cans, glass containers, newspapers, telephone books, cardboard, brown paper bags, feed and seed sacks, white paper, computer paper, used clothing, and plastic	Buy-back		County employees recycle paper and donate to Boy Scouts	Andersen Recycling	Pays for beverage cans and glass containers	Beardsley and Graceville
BLUE EARTH	Newspapers,card board	Donation	Collection on regular garbage days began 5/1/88	County subsidizing cost of shredding, baling, and transport to market, financed by 60-cent increase in waste disposal fees; Recycle Alternatives Committee	Kato Sanitation (for 6 months, any hauler can drop off)	Public education through billing inserts	Mankato, Madison Lake (open to haulers from other cities also)

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Blue Earth (cont.)	Aluminum, glass	Redemption			Mankato Iron & Metal	Pays for aluminum	Mankato
	Aluminum	Donation				Proceeds go to community program	Madison Lake
	Glass	Barrels			St. Clair Actioneers (non-profit)		St. Clair, Mankato, Pemberton, Good Thunder, Rapidan
BROWN							
CARLTON							
CASS	Aluminum cans, steel cans, brass, copper, newsprint, glass, cardboard, batteries, aluminum scrap, plastic bottles, radiators	Buy-back			C & C Recycling	Pays for many materials	Walker
	Aluminum	Mobile buy-back once per week			Dave's Cash for Cans	Pays for aluminum	Walker Boy River
CHIPPEWA		* At landfill			* County		

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CHISAGO	Aluminum, metal beverage and food cans, glass, plastic containers, cardboard, newspapers, cloth	Redemption and processing	Recycling Advisory Committee	East Central Solid Waste Commission has hired Minnesota Project to develop recycling program	Chisago County DAC in cooperation with Python Recycling and Chisago Lakes Distributing (providing equipment and markets)	Pays for aluminum and glass	Located in Chisago City
CLAY							
CLEARWATER							
COOK	Cardboard	Donation opened 9/87		Handles approx. 8% of county's waste stream			
COTTON-WOOD							
CROW WING	Aluminum Metal, glass, batteries, newsprint, cardboard	Buy-back			Crow Wing Recycling Darrell Roberts and Darrel Westburg	Pay for materials	Brainerd
DODGE	Newspaper	Donation			ABC Recycling Center		Kasson, Dodge Center, Hayfield

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DOUGLAS	*Glass, aluminum and metal cans, newsprint, corrugated; expand to include office and computer paper, scrap metal, white goods	*Dropboxes to be located in 2 cities and 3 townships	*Curbside pickup to be implemented in 1 city and 3 townships	*Received LOW-TECH grant 8/25/88	*Douglas County owner, Alex Rubbish operator	*Public education	*Cities of Nelson, Forada, Alexandria, townships of Alexandria, LaGrande, Carlos
FARIBAULT	Aluminum, cardboard, glass, newspaper, plastic			Faribault County Recycling to close 8/31/88; reasons cited include lack of management, equipment, promotion budget	Faribault County Recycling, Inc. (subsidized by county)		Collection in Blue Earth, Bricelyn, Delavan, Easton, Elmore, Frost, Kiester, Minnesota Lake, Wells and Winnebago
FILLMORE	Newspaper, three types of plastic, glass, aluminum, steel, tin cans		Pick-up available in all cities in county	Processing Center; Resource Recycling Committee		Mandatory source separation ordinance	
FREEBORN							
GOODHUE				Red Wing Recycling Advisory Committee			Red Wing
			* Planned with LOW-TECH grant received from WMB 8/25/88	* Will hire part-time education coordinator	Cannon Environmental Coalition/ Greenline Disposal		Cannon Falls

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COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
GRANT	Glass, containers, bi-metal beverage cans, aluminum cans, scrap aluminum, high grade office paper, corrugated, newspaper, copper, brass, radiators, and plastic containers	Buy-back		County subsidizes Andersen Recycling up to $15/ton of waste recycled; 10% of subsidy must be used for public ed; 3 month reports on amount of waste recycled required	Andersen Recycling (private)	Pays for some materials	Commercial and Residential
HOUSTON	*Glass, newspapers, high-grade plastics, aluminum	*7 drop-off sites planned for fall '88; 1 buy-back center operating		Recycling Task Force	Woodland industries; County will provide building, equipment, truck	*County extension agent will devote 20-30% of time to waste education	Buy-back center in Caledonia; Planned drop-off sites to be located in all cities in county
HUBBARD							
ISANTI				East Central Solid Waste Commission hired Minnesota Project to develop recycling program			

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ITASCA	Corrugated, ledger grade, computer paper, plastic, aluminum, glass, newspaper Cardboard, newspaper, plastic, aluminum	Buy-back Donation at landfill		Officer paper recycling in county offices, some used for animal bedding	North Country Recycling Itasca County	Pays for some materials	Grand Rapids Itasca County
JACKSON	Newspapers, aluminum, cardboard				Volunteer groups		
KANABEC				East Central Solid Waste Commission Recycling Task Force to develop recycling program; hired Minnesota Project			
KANDIYOHI	Aluminum, container glass, newspapers, paper, cardboard	Buy-back center and boxes for newspapers	Pick-up of paper and cardboard for businesses		West Central Industries	Pays for aluminum and glass	Willmar
KITTSON							
KOOCHICHING							

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COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
LAC QUI PARLE	Aluminum cans, glass, cardboard, white goods				Olson-Dray Recycling		Dawson
LAKE	Newspaper, glass, aluminum	Drop-off, Two Harbors		Task Force, working with Minnesota Project; pilot project to eventually become county-wide	DAC (Python's Recycle Center of Duluth helped with set up and will buy recyclables)		Lake County Residents, Two Harbors area
LAKE OF THE WOODS	Glass, metal, paper, plastic, cardboard, newsprint	* Drop-off in Baudette & Graceton		* Received WMB DEMO grant 3/24/88; will build 2 recycling facilities; combines mechanical & source separation	* County owned		* Lake of Woods County
LE SUEUR							
LINCOLN							
LYON	Glass, aluminum, cans, metal cans,newsprint, cardboard newspaper		Weekly pick-up Monthly pick-up	Recycling subcommittee of County Solid Waste Advisory Committee	Larson Services (waste hauler) Tracy Lions Club		Tracy Tracy
MAHNOMEN							
MARSHALL							

APPENDIX C

RECYCLING PROGRAMS IN GREATER MINNESOTA COUNTIES

This table presents a sampling of recycling programs in Greater Minnesota Counties.
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COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
MARTIN	Plastics, cardboard, glass	Donation and processing center			Waste Systems	All haulers except one charge per bag	Located in Fairmont
	Newspapers	Donation box once per month			Boy Scouts		Located in Fairmont
	Aluminum	Drop-off			Pooley's Scrap Iron and Metal		
	Cardboard		Pick-up from businesses		Waste Systems		Truman
MCLEOD							
MEEKER							
MILLE LACS				East Central Solid Waste Commission hired Minnesota Project to develop recycling program			
MORRISON		17 drop boxes			Morrison County DAC	Mandatory Source Separation Ordinance	

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MOWER		* Drop boxes in remainder of county	* Pick-up in Austin & Mapleview	* Received LOW-TECH grant 8/25/88 for centralized processing of recyclables	Mower County - Owner; Cedar Valley - Operator		
MURRAY							
NICOLLET							
NOBLES							
NORMAN							
OLMSTED	Glass, newspapers, computer paper, aluminum, corrugated	Olmsted County Recycling Center: buy-back and processing center, also receives recyclables from 17 drop-off boxes			Ability Building Center		Olmsted County: Dropboxes in Rochester, Byron, Dover, Eyota
OTTER TAIL		*4 redemption centers, 10 drop-off sites		Fergus Falls Middle School Recycling Contest	*Perrin Recycling won bid; will work with DAC		*Otter Tail County (redemption centers in Fergus Falls, Pelican Rapids, Perham and Parkers Prairie)
PENNINGTON							

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PINE				East Central Solid Waste Commission hired Minnesota Project to develop recycling program			
PIPESTONE							
POLK	Aluminum, newspaper, scrap metal	7 locations some buy-back		Citizens Advisory Council	Private, some with public subsidy	Pay for some materials	Polk County
POPE							
RED LAKE							
REDWOOD	*Aluminum, glass, newspaper	* Buy-back center			Redwood County DAC with subsidy from county		Located in Redwood Falls
RENVILLE							
RICE	*Plastics, paper, glass, aluminum, tin cans	*Drop-off for public begins 8/88	*collection from county offices begins 7/88		*Sampson Recycling (private with $400/year county subsidy)		
ROCK							
ROSEAU							
ST LOUIS							

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SHERBURNE	Aluminum, glass, newspapers				St. Cloud City Council	Lottery	St. Cloud
SIBLEY							
STEARNS	Aluminum, glass, newspapers Newspapers, yard waste Aluminum, newspaper, glass	Redemption center	2X monthly		St. Cloud City Council Bueckers Sanitary Service Recycling World (private)	Lottery *Plans volume-based fees 7/1/88 Pays for aluminum, newspapers, and glass	St. Cloud Albany, Avon Melrose
STEELE					Sampson Recycling		
STEVENS					DAC & Private business		Morris
SWIFT		* Planned	* Planned	* Received LOW-TECH grant 8/25/88 for recycling program	Swift County	*Public Education Planned	
TODD	Newspaper, glass aluminum, plastic, cardboard, tin cans			DAC recycles 2.3% of county's MSW	Browerville DAC		

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COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
TRAVERSE	*Aluminum and bi-metal beverage cans, scrap aluminum, glass, copper and brass radiators, cardboard, feed/seed sacks, computer paper, milk jugs, plastic	*Buy-back center			*Contract awarded to Andersen Recycling (private) with subsidy	*Pays for beverage cans, scrap aluminum, glass, copper and brass radiators	*Start with Wheaton, Dumont, Tintah, Browns Valley
WABASHA	Plastic, glass, newspaper, computer and bond paper, aluminum Glass, paper, aluminum, some metals	 Recycling shed Donation	2X monthly pick-up Yes, frequency unknown	City will pass "scavenger ordinance" if recycler unable to collect all aluminum County Recycling task force meeting since 8/87; shed purchased with local donations	Darr Refuse Shed serviced by 4-H	Pick-up free to Lake City residents	Lake City Mazeppa Plainview, Elgin
WADENA							
WASECA					Sampson Recycling		
WATONWAN	Paper, aluminum cans				Volunteer organizations		

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COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
WILKIN	Aluminum cans	Wolverton fire station			Fire station	Money raised will be used to build a playground	
WINONA	Aluminum, steel cans, newspaper, glass, plastic, corrugated	28 drop-off sheds		Recycling Clerk; 45 tons collected in 4/88 Countywide white goods recycling program			Sheds located in Altura, Dakota, Elba, Fremont, Gilmore Valley, Hart, Hidden Valley, Homer, Lewiston, Minnesota City, Nodine, Pickwick, Pleasant Valley, Rollingstone, Stockton, Troy, Utica, Whitewater, Winona City, Witoka
	Newspaper, glass, tin cans, aluminum, high-density plastics	20 apartment drop boxes (Winona)	Monthly	Before ordinance in effect, 17% participation rate Yard Waste Ban at landfill effective 11/87 Ban on recyclable materials at landfill effective 10/88	Occupational Rehabilita-tion Center collects	Mandatory recycling effective 7/1/88 -- petty misdemeanor, fine up to $200; applies to homeowners, apartment dwellers, commercial businesses, and industries.	City of Winona, St. Charles, Goodview, Stockton

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COUNTY	MATERIALS	DROP-OFF	CURBSIDE	OTHER	OWNER/ OPERATOR	INCENTIVES	TARGET POPULATION
WINONA (cont.)	Glass, newsprint, tin, aluminum, and high-density plastics		Monthly				Goodview, St. Charles, Lewiston
WRIGHT	Newspaper, glass, aluminum, steel cans, scrap iron	14 drop-off boxes for rural areas	Monthly in Delano, Howard Lake	Recycling Coordinator; 2 recycling businesses		City and volunteer organizations	
	Aluminum, glass, tin, newspaper, corrugated, waste oil, batteries	Mobile redemption center			Private	Pays for aluminum	5 cities monthly; 5 cities weekly
	Aluminum, glass, tin, newspaper, corrugated, waste oil, batteries	Buy-back		City Recycling Committee	Private Wright County DAC	Pays for aluminum ; for other materials coupons can be credited to utility bills; recycler of month award	Buffalo
YELLOW MEDICINE							
WLSSD	Aluminum, paper, glass	Buy-back, 2X monthly				Pays for all materials	Located in Duluth

*Denotes programs that were planned but not implemented at the time of the article.
SOURCE: Table compiled by WMB staff from press clippings. Includes only clippings received through 7/31/88