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Implementation of 1989 Wisconsin Act 335 recycling law

Nancy L. Buss

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IMPLEMENTATION OF
1989 WISCONSIN ACT 335
RECYCLING LAW

By
NANCY L. BUSS

AN APPLIED MANAGEMENT
DECISION REPORT
SUBMITTED IN PARTIAL FULFILLMENT
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ABSTRACT

This AMDR analyzes alternative methods of implementing the State of Wisconsin 1989 Wisconsin Act 335, Recycling Law. In the current time period as many are suffering from the effects of an economic recession, taxpayers are obviously discontent with the services and costs provided by all branches of the government. Yet, some services are mandated by the State and Federal Governments, and the municipalities have no choice but to make decisions that represent the best interests of all within their jurisdiction.

The scope of this report will evaluate alternative methods of mandated recycling. Although the City of Sheboygan currently collects all solid waste other than yard waste from residents, the City will be forced to implement by January 1, 1995, a method to collect and separate recyclable materials. The full process of recycling materials includes collection, separation, preparing to buyer’s specifications, sale to markets, processing and eventual reuse of the materials. This report will deal with the initial steps in the process, collection and separation of recyclable materials.

Two basic methods of extracting recyclables from the waste stream are drop-off centers and curbside collection. These two alternatives differ in the amount of citizen participation required. While both alternatives require residents to prepare and store the recyclables, the drop-off
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INTRODUCTION

The Wisconsin Recycling Law, 1989 Wisconsin Act 335, was signed by Governor Tommy Thompson on April 27, 1990. Senator Joseph Strohl of Racine, chairman of the Legislative Council's Special Committee on Solid Waste Management that drafted the bill, calls it "the most comprehensive recycling bill in the nation" (Cofield, 1990, p. 135). The effects of Wisconsin Act 335 will be most evident after January 1, 1995, when all recyclable materials will be banned from solid waste disposal facilities. These materials include aluminum, plastics, steel, waste tires, bimetal containers, corrugated paper, foam polystyrene packaging, glass, and printed material including magazines, newsprint and office paper. In addition, the law also bans waste oil from land disposal or incineration after January 1, 1991; and yard waste by January 3, 1993. The goal of the bill is to reduce waste by 60% of the 6.5 million tons of waste annually generated in the State.

The law designates municipalities as responsible units. A requirement of the municipality is to develop and implement an effective recycling program. The law and sections of Wisconsin Act 335 define an effective program as one that "requires residential, commercial, retail, industrial and governmental buildings to provide some method to recover recyclables" (Cofield, 1990, p. 138). The Act directs responsible units to submit to the Wisconsin Department of Natural Resources a report stating the intent to implement a
recycling program as it pertains to the bans by January 1, 1993. This report must include implementation of the various components of the established program; polices and procedures established to manage the solid waste, market the separated recyclables and educate the public; management of solid waste that is not included in the recyclable program; and dates of implementation of the established program. All programs will be monitored by the solid waste bureau of the Wisconsin Department of Natural Resources.

Planning an effective recycling program that could be implemented with the maximum amount of participation lead to the evaluation of a number of alternative methods available for collection and processing of recyclable solid waste. The program implemented must take into consideration education of the public, composition and quantity of the waste stream, estimates of current recycling rates, as well as an evaluation of market conditions for recycled materials and available disposal options. The cost effectiveness of the program is also a major concern to the municipality.
BACKGROUND INFORMATION

Americans in general, have relished the convenience of being a throwaway society. In an effort to protect public health and community livability, residential solid waste is collected by the governing body. This concept evolved from the realization that waste is the cause of disease and other problems. While frequent waste collection dealt with the immediate concerns of health topics, waste disposal has created long-range problems recently recognized. Rapid diminishing landfill space and the generation of pollutants and their release into the atmosphere from incineration are some of these issues.

Once before, during World War II, Americans were encouraged to start conserving. At that time, the war with Japan and Germany seriously limited the United States' resources. Initially, it was difficult to persuade citizens to participate, but as the needs grew desperate for wartime products, Americans united in a unique conservation effort. President Franklin D. Roosevelt created the War Production Board, which outlined the needs for industries to be converted to assist in the wartime effort. The Board's Bureau of Industrial Conservation, asked Americans to "send their scrap metal, paper, rags, rubber, and other usable materials to junk dealers and collection charities" (Modell, 1990, p. 102). Items previously considered junk became valuable, and the junk dealers indispensable. The success of the 'War on Waste' during World War II can be attributed to
the creation of a campaign that united Americans in an effort to salvage.

**THE CITY OF SHEBOYGAN**

The City of Sheboygan has 49,676 residents and approximately 16,150 residential households. Municipal crews collect solid waste from residential and multifamily residential buildings housing less than four units, and some governmental offices. All multifamily residential buildings housing four or more units, commercial, retail, industrial, hospitals, and some governmental units currently have solid waste collected by a private firm.

The current method of curbside collection of solid waste has been in place since inception of the City Public Works Department. Initially, solid waste was collected twice weekly, and the collection crews walked up to the property and collected the waste from individual property owners' storage sites. The 1970's brought changes that were opposed by many. Solid waste was collected only at the curb in cans or bags, with the schedule changed to weekly collection. During the 1980's residents could no longer put cans at the curb for collection, all waste had to be put in bags for collection. This requirement was due to a high frequency of back injuries among the solid waste collection crews resulting in worker compensation claims. Since 1989, residents are required to bring yard waste to a drop-off site, rather than put it at the curb. The changes outlined seem minimal, with little or no real effect to the quality of
life in the community. Yet, to the conservative mainly German and Dutch population of Sheboygan, these were dramatic.

All of the costs associated with solid waste collection and disposal are part of the City general operating fund and paid for through the local tax levy. The costs are separated by activity; garbage collection, recycling and incineration, as well as detailed by objective within the activity; labor, fringe, contractual and administrative services. The result of combining these costs into the tax levy is that most individuals see "little connection between their purchasing and disposal behavior and the costs of waste management" (Sloane, 1991, p. GM2).

A voluntary recycling program was implemented in 1975 following a mandate from the State of Wisconsin. The State mandated that the owner or operator of any solid waste collection center must provide a recycling collection center unless a certain number already exist within the City. The municipal incinerator, owned and operated by the City, qualified as the solid waste collection center. At the time no other recycling collection centers were available, therefore the City opened a drop-off site and encouraged residents to recycle glass, aluminum, newspapers, cardboard, motor oil and metal and tin cans. The drop-off site was open the third Saturday of each month, staffed by a volunteer group to aid in separation. This program appeared to be quite successful with an estimated participation of eight
percent of the households. This program continued until
1989.

The City implemented a refuse collection regulation on
March 6, 1989, that eliminated curb side pick-up of certain
items. Yard waste, including grass clippings, leaves, garden
debris, sod and other vegetative materials must be brought to
a drop-off site which is open three days per week, Tuesday,
Thursday and Saturday. This change was implemented by early
indications of the mandates from the State of Wisconsin
prohibiting yard waste from solid waste disposal facilities by
1993, as well as upgrades planned for the municipal owned
incinerator. The refuse collection regulation also included
other materials classified by the Wisconsin Department of
Natural Resources as toxic or hazardous waste which requires
special handling and disposal methods. These materials will
not be collected by City crews. The City has established a
biennial Household Hazardous Waste Clean Sweep Program, which
allows residents to drop-off at a designated site, any
materials that are categorized as toxic or hazardous waste.

The 26 year old incinerator was unable to meet State of
Wisconsin Department of Natural Resource regulations for
stack testing in 1988, forcing the City to make major repairs
or close the facility. The necessary upgrades completed in
1989 included retrofitting the gas burners. The moisture
produced from lawn refuse would have caused the new equipment
to be quite inefficient. Elimination of yard waste has
reduced the waste stream volume by 16 percent, comparing 1990

Residents are encouraged to leave grass clippings on the lawn or use for mulch or compost. The yard waste brought to the drop-off site, including grass clippings, sod, garden debris and leaves are taken to a compost site. Tree branches and brush trimmings deposited at the drop-off site are run through a chipper and utilized in various street and park department projects. Wood chips are also available to residents at no charge.

The resident drop-off site also is a collection area for recycled materials. Recycling is encouraged, but not mandated. All solid waste, except for lawn refuse and toxic material, is picked up weekly through the curb side collections. Currently, it is estimated that ten percent of the residents recycle on a voluntary basis. In addition to the City operated drop-off site, the community has six privately operated buy-back centers and one privately operated drop-off center for recyclables. The public can bring separated recyclables to the buy-back center and receive a token amount of money in return. Buy-back centers have been very effective nationally at recovering aluminum cans. There are no estimates available on the number of residents using these recycling centers.

The City has established a Solid Waste Advisory Recycling Committee that will be responsible for implementation of the mandates for recycling. During April
1991, this committee recommended to the City Council a pilot program of 300 residents in a designated area that would be mandated to participate in recycling. The recommendation included provisions for the recyclable materials to be collected by a private firm that would be responsible for marketing the recyclables. The Common Council filed the recommendation, basically taking no action. As of this writing, no formal recycling program is in place. The public opinion on the mandates and implementation is varied, yet there is a high amount of suggestion that the City is lacking leadership in this rather simple means of saving our valued environment. The incinerator superintendent position has been changed to Solid Waste Coordinator, in an effort to begin the coordination of the implementation of the State mandates.
PROBLEM IDENTIFICATION

The City of Sheboygan will be forced to change solid waste collection methods to meet State mandates by 1995, as well as formulate by January 1, 1993, a report to be submitted to the Wisconsin Department of Natural Resources outlining the planned methods of implementation. The current tax levy includes weekly solid waste collection, but all factors indicate that recycling, although thought to make economic good sense, will be more costly than present collection methods. The basic collection of the refuse will be more labor intense and require special equipment.

In addition to the mandates of the recycling bill, the City must take into consideration numerous other factors. The aging incinerator has been a major source of contention over the past two years. "One million dollars has already been invested in new incinerator equipment" (Schulz, 1989, p. 1) to meet current regulations enforced by the Wisconsin Department of Natural Resources. "Another four million dollars would have to be invested in the next two years to further upgrade the incinerator to comply with pending rule changes" (Schulz, 1990, p. 1) of the Clear Air Act and the Lowest Achievable Emissions Rate guidelines. In order to keep costs down through energy sales, an additional investment of three to four million dollars "would be needed to install equipment to convert incinerator heat to either steam or hot water that could be sold" (Schulz, 1990, p.1). A decision regarding the future of the incinerator must be
made by the City soon. If something is not done to improve the facility to meet the regulations, it is very probable that the Wisconsin Department of Natural Resources will order a deadline for repairs to be made or the facility closed.

Sheboygan County, acting as an agent for all municipalities within its jurisdiction, has entered into an agreement for landfill disposal of solid waste at the Ridgeview Landfill located in Whitelaw, Wisconsin. Whitelaw is located in nearby Manitowoc County. This facility is owned and operated by Waste Management, a nationwide waste management company headquartered in Oak Brook, Illinois. The contract calls for cost containment for transportation and disposal of 40.73 dollars per ton with yearly increases tied to the consumer price index. The facility is an immediately available alternative for solid waste disposal for the City. The advantages are immediate implementation, the facility is operated by the private sector, and the price per ton is a cost effective approach to solid waste disposal. The disadvantage is the loss of control by government and long term care of the site is required. The contract between Sheboygan County and Waste Management contains a no long term liability clause for damage cause by solid waste disposal to the environment. On paper, this appears to be ideal, yet both the State of Wisconsin Statutues and the United States Environmental Protection Agency have clauses that establish perpetual liability for damage to the environment caused by solid waste disposal. Considered at one time to be a
disadvantage was the threat of long term limitations on landfill sites. The manager of the Ridgeview site, Christian Johnson confirmed that the site "has 15 to 18 years of capacity, with 600 acres in reserve for future development and could easily handle Sheboygan's garbage" (Schultz, 1989, p.1).

Solid waste collection is currently performed by City labor crews and City-owned vehicles. The labor crews are covered under union contracts which include fringe benefit costs that have increased dramatically. The garbage trucks, purchased in 1981, have experienced costly maintenance and upkeep as well as extensive down time. The 1990 maintenance expenses for seven garbage packers totalled sixty thousand dollars, an average of 8,573 dollars per vehicle as recorded by the City of Sheboygan Finance Department. Replacement of the garbage packers has been requested through the budgeting process in the past three years, but a decision has been delayed due to anticipation of mandated recycling as well as the uncertainty of the future of the incinerator. The solid waste is mass burned at the municipal continuous feed incinerator. Ash from the incinerator is currently being landfilled at the Ridgeview site. The ash is solid material, composed of noncombustible inorganic materials and complex organic materials, formed from the combustion of fuels in the burning process. The City contracts with a firm to transport the ash to the Ridgeview facility. The contract requires the City to pay 40.73 dollars per ton for transportation and
disposal of the ash, with annual increases tied to the consumer price index.

The City has five private haulers, currently serving business clients as well as performing residential collection in surrounding smaller communities. A study completed by New York's Columbia University researchers showed that "38% of residential garbage is collected by public works departments and 62% is collected by private companies" (Bennett, 1990, p. GM12). Estimates of collection costs show that private collection "can cost up to 40% less than the same service provided by government" (Bennett, 1990, p. GM12). Most of the difference is attributed to labor costs. Communities where public works departments must bid against private companies for solid waste collection, result in the most cost efficient operations for taxpayers. The City of Sheboygan has never required the Department of Public Works to bid for solid waste collection.

The City must face the above outlined problems cummulatively in order to make a decision that will satisfy immediate needs as well as those mandated by the State. The leadership of the City, the Common Council and the Mayor, appear to be viewing each of these as individual decisions, rather than as components of a decision leading to the total management of the solid waste within the City. Local planning requires a thorough consideration of the waste stream and a conscious shift toward recycling to implement an integrated waste management program.
PROBLEM ANALYSIS

The Solid Waste Advisory Recycling Committee has had their initial recommendation rejected by the Common Council. It is now essential for this committee to formulate objectives that will ultimately lead to the long range goal of effective implementation of the State mandates. The objectives will provide guidance to assure that a schedule is maintained in order to meet the January 1, 1993 required report submission date to the Wisconsin Department of Natural Resources and the January 1, 1995 implementation date. These objectives can also serve as a measurement of progress.

Development of a comprehensive City wide plan that is accepted and adopted by the Common Council is fundamental. Due to the controversy regarding the incinerator, it may be difficult to formulate a recycling program that will receive full support from the Council. The title change for the incinerator superintendent to Solid Waste Coordinator acknowledges the need to establish change in the complete solid waste collection and disposal methods. As in the achievement of any long term goal, it is essential to have the full backing of those in charge with authority to achieve success. In the case of the City, those in command with authority are the Common Council and the Mayor.

EDUCATION AND PUBLIC INFORMATION

Establishment of a positive attitude toward recycling among residents can be achieved through educational and promotional activities. A recycling logo and theme contest
has been initiated, inviting all residents to participate. A special promotion of the logo and theme contest at all schools in the area was implemented to create awareness among the students. The Solid Waste Coordinator is educating many citizens through public speaking engagements at civic and social group activities. Upon request, the Solid Waste Coordinator will be available to teach recycling to students of all ages through individual classroom instruction or general assemblies held at the school. A recycling learning center, utilizing exhibits/displays, training sessions, hands-on workshops and group presentations is another way of educating and promoting recycling. This center would serve the public as a information network to visit or call to learn about recycling and the environment. Another service that could be available at the center is a resource library featuring books, video tapes, teaching aids and other literary materials available on recycling. In general, implementation of a recycling program will require an ongoing public awareness and information campaign to encourage citizens to prepare waste in the desired manner.

The 1990 Bureau of the Census information collected reveals in Table 3, Age by Race and Hispanic Origin that the residential population of the City is basically white, accounting for 46,901 residents of the total 49,676. Other races represented with percentages less than one are Black with 104 residents and American Indian with 216 residents. The Asian and Pacific Islander population of the City is near
four percent, accounting for 1,927 residents, consisting of Hmong refugees from Vietnam. Other races account for 528 residents. A special effort to educate the Asian and Pacific Islander group of residents is necessary. City personnel have worked with a Hmong interpreter through the public library and grant programs. These programs have established some communication with this segment of the population and should aid in development of a recycling program.

**WASTE STREAM**

The development of a residential program is dependent upon an accurate measurement of waste quantity and waste composition. The City has an accurate measurement of waste quantity generated from current solid waste collections that are deposited at the municipal incinerator. The solid waste collected for incineration from City residents for 1990 was 15,101.15 tons per City of Sheboygan Finance Department records. This equates to .306385 tons, or 612.770 pounds per person per year, based on 49,676 residents. Daily, each residents waste totals 1.678821 pounds, which is well within the four pound per day conclusion in a 1990 study conducted for the United States Environmental Protection Agency by Franklin Associates, Ltd. "Residential waste represents approximately half of the solid waste in many communities" (Goldman, 1991, p. 53). Prior to elimination of yard waste collection, the per person per day volume in the City was 1.999429 pounds. Using these accurate measurements, as well as projected future population levels, the waste quantity can
be quite accurately estimated for 20 to 30 years into the future.

The measurement of the proportion of different components of the waste stream is not currently available and is of importance. A statistically significant number of solid waste loads collected should be manually sorted over a certain period of time to accurately determine the composition. This method of waste component measurement would be expensive, and the usefulness of the details would have to be cost justified. A number of waste composition studies have been completed. Unfortunately, too often the data combines residential and commercial waste, as well as varying bases of classifications of materials. The data is collected in broad classifications, such as paper, for some studies while other studies break paper into newsprint, magazines, and office paper. As these types of studies improve and become more extensive, the City may be able to calculate an acceptable measurement without a large cost investment. The Environmental Defense Fund is involved in determining the accuracy of studies that provide detailed waste management data. The more detail there is available about the quantity and composition of the waste stream within cost constraints, "the more accurately collection, processing, and marketing programs can be designed" (Environmental, 1988, p. 44). The grant funding available from the State of Wisconsin requires communities to project accurate measurements of waste composition.
OFFICE PAPER RECYCLING

Assistance to offices and retail businesses wishing to establish a recycling program is currently being offered by the local Chamber of Commerce. A seminar is planned with speakers and handouts outlining details from three successful implementations of office paper recycling programs. The speakers include the Recycling Expert from the Wisconsin Department of Natural Resources Southeast District Office, the owner of a local waste recovery firm and a private waste hauler. The waste recovery firm will have available to participants individual desk collection containers to assist in implementing recycling programs.

The establishment of an office paper recycling program should be incorporated in all City buildings as soon as possible. This program would involve the recognition by participants of the types of paper that are recyclable, with available facilities for collection and sorting. A guide to implementation of office paper recycling program will be available from the Chamber of Commerce. Offices, especially banks and insurance companies, generate large amounts of high quality paper. The implementation of an office paper recycling program can reduce disposal costs and generate revenue through paper sales dependent on the market potential available. Successful implementation of an office paper recycling program within City buildings would be an added incentive to other offices considering a similar program to demonstrate the cost effectiveness and ease of set-up.
MULTIFAMILY RESIDENTIAL RECYCLING

Multifamily recycling is a definite challenge due to the very diverse buildings in many different settings. Too often apartment dwellers feel they have so little to recycle that their participation will not make a difference. The building's management and tenant organization should be provided with educational information. Essential to the program is the support of the management and maintenance staff. The maintenance staff will be required to design a storage system on site, a place to keep recyclable materials safe and clean until picked up by a private hauler. The design should be individually suited to the building's structure and residents' need. The storage area for recyclable materials must be easy for residents to access as well as haulers to unload. Reminders, such as posters, door hangers and newsletters could be used to provide residents with feedback regarding participation and recycling tips.

The Wisconsin Department of Natural Resources has produced a fifteen minute video outlining the effects of establishing an effective multifamily unit recycling program. This video, titled 'Recycling: Ideas and Initiatives for Apartment Communities' could be used as an educational tool for building management and tenant organizations. The Environmental Act Coalition is involved in numerous apartment building recycling programs, and cite newspapers as the largest volume of recyclable materials collected. The manual separation of recyclable materials by residents will produce
high quality materials removed from the waste stream as well as reduce disposal costs at the solid waste disposal facility.

COMMERCIAL RECYCLING

Recycling makes economic sense for business. Each individual business must examine the waste stream produced and determine which residues can be collected. Most manufacturing industries find recycling to be profitable, especially when markets are strong. The value of the materials exceed the cost to dispose of the materials at a landfill or the municipal incinerator. Mr. Rich Koppitz, a vice president at K.W. Muth Co., a plastics manufacturing firm in the City of Sheboygan states "the income from selling production waste and the savings of landfill fees adds up to seven digits" (Fairbanks, 1991, p. 4) for the company. The Solid Waste Coordinator will be available to assist in initial recognition of potential recyclable materials. After this initial determination, it is necessary to establish the infrastructure and personnel to achieve the desired result of returning the materials to eventual reuse. Appointing a person within the corporate structure to control the solid waste flow and investigate potential markets is becoming a necessity. The position of the recovery manager normally uncovers recyclable surplus materials, finds markets for the materials, and devises a method for separating the materials and delivering them to market. Although this position is not normally considered upper management, is it a important
position from the viewpoint of potential revenue for the business.

The office paper recycling program is an easy method of introducing the idea of recycling within the business without major cost expenditures. Other recycling opportunities exist by supplying the business' needs from surplus as well as selling the materials which cannot be used, and disposing of materials that have no market at the lowest cost possible. Several states have established industrial waste exchanges to find markets for surplus materials. This program could initially be implemented on a City wide basis and extended beyond, depending upon interest and material availability. The implementation of a successful recycling program can promote positive publicity for the business as well as contribute to the local community. The amount of collection and disposal savings can be substantial for any business, from the restaurant recycled glass to the manufacturer recycled residue from products produced.

RESIDENTIAL RECYCLING

Even though the City must be actively involved in the implementation of recycling programs in all residential, commercial, retail, industrial and governmental buildings, the most active participation will be on the residential level. Recyclable materials generated by residents can be collected in two basic methods, either through drop-off sites or curbside collection. It will be the responsibility of the Solid Waste Advisory Recycling Committee to determine the
method of collecting the recyclables as well as the separation, preparation to buyer's specifications, and sale to markets. The method of collection must appeal to citizens to achieve the fullest extent possible of participation, as well as taking into consideration the cost analysis, so the effects on the individual taxpayers will be minimal. A recommendation to retain the service to be completed by City labor crews and City vehicles, or to contract with private haulers for all or part of the process will be required of the Solid Waste Committee. In addition to the cost analysis necessary, the political structure of City government makes any decision to move services out of the public section very controversial. The loss of control has always been a major deterrent to contracting services. The committee must have concrete evidence to earn the support of the other Council members, regardless whether the recommendation is to move all or part of the process to the private sector.

**COSTS AND BENEFITS**

The costs of recycling programs vary greatly due to the specific economy of each individual area and the program structure. The start-up costs include planning costs for development and printing of education materials to be distributed, as well as any studies needed to determine waste quantity, waste composition, and market assessments. Dependent upon the method of collection and processing implemented, start-up costs could be extended to capital costs for equipment needs. The operating costs, if the
collection is done by the public sector, would include labor and fringe benefit costs, equipment operation and maintenance, fuel, supplies, debt service on any capital expenditures, administrative/overhead costs, and marketing costs. Operating costs would involve the contracted price with a private hauler for collection, separation, processing and marketing recyclable materials if the operation is moved to the private sector.

Economic analysis including potential revenues and benefits of recycling will be essential in the determination of the method used for the program implemented. In many programs, the sale of recovered materials does not cover the operating program costs. Savings of disposal costs, a major consideration, can be calculated by estimating the total tonnage diverted from the waste stream times the disposal costs at the incinerator or landfill. The program can also be a stimulator of economic growth, with present local business' handling or processing collected materials or new business entering the market due to the availability of recyclable materials.

The current regulations of Wisconsin Act 335 mandates that if there are no markets for the recyclable materials, they can be landfilled or incinerated. Currently, there is some lobbying to have this changed and to no longer allow incineration but to allow landfilling. As of this writing, there have been no definite decisions regarding recyclable materials that are unmarketable after January 1, 1995.
OTHER CONSIDERATIONS

The United States Environmental Protection Agency (EPA) has required residents in Sheboygan County to limit the amount of air pollution caused by petroleum products, including gasoline. This limitation is a result of the decision by the United States EPA to reaffirm strict new air pollution limits by the year 2000. Sheboygan County has received a serious problem classification with ozone pollution, which includes a faster timetable for cleaning up the air. The requirements will include "more efficient use of automobiles and trucks" (Fairbanks, 1991, p. 1). This restriction will severely limit some of the alternatives available with implementation of a recycling program. Additional vehicles involved in collection would be a potential problem, although state of the art collection vehicles are more fuel efficient and may use alternative fuels or have more elaborate pollution control systems. The current collection fleet used by the City is ten years old and does not have any of the features noted above. The capital outlay involved with purchase of new vehicles would be a major cost deterrent.

The City of Sheboygan, utilizing a grant from the State of Wisconsin, has entered into a contract with R.W. Beck & Associates, Madison, Wisconsin to provide a feasibility study including an overview and details of the regulatory requirements related to the municipal incinerator. All municipal solid waste facilities in the United States are
required to operate under a comprehensive set of emission limitations. Noted in the draft of the report, "these limitations have been in a state of flux for several years" (Beck, 1991, p. 1). The study revealed that the floor in the tipping area, the ash truck room and the truck storage area are in serious destructive condition. The concrete and reinforcements are suffering from degradation, with corrosion extending to the mid-slab point, the area where the slabs are required to carry the highest amount of stress. Continued heavy truck traffic use of this area could result in catastrophic failure of the floor. Immediate repairs are recommended which would entail shutting down the facility and repair costs of approximately two million dollars. The total project cost estimate to bring the plant into regulation is 14.8 million dollars. The estimate, believed to be on the high end, would include retrofitting, which essentially amounts to a complete equipment replacement, and converting the incinerator from the current mass burn facility to a waste to energy facility. The updating would require shutting down the incinerator for a period of nine months to one year due to "the complete demolition and replacement of the existing dual furnace trains with a single modular mass burn system" (Beck, 1991, p. 12). Repeatedly mentioned throughout the report is the fact that the municipal incinerator is 26 years old and suffering from typical wear for a facility of that age.
DESCRIPTION OF POTENTIAL SOLUTIONS

Two basic methods of extracting recyclables, drop-off centers and curbside collection are outlined below as potential alternatives. A third option, privatization of solid waste collection is also outlined. The alternative to do nothing is not an option due to the State mandates.

The City of Sheboygan currently operates a solid waste collection system as well as a drop-off center. The drop-off center is for yard waste and voluntary recycling efforts, while curbside collection takes all other solid waste. Solid waste collected is brought to a municipally owned incinerator, where it is burned. The ash from the incinerator is taken to the Ridgeview landfill by a private hauler. Total solid waste tonnage brought to the municipal incinerator is contained in Appendix A. In addition to the City solid waste collection, a few surrounding communities also burn waste at the incinerator. Appendix A includes a monthly table of burned waste for the total incinerator as well as for the waste collected by City crews.

The expense of the current system of handling all solid waste is broken down into three separate areas. These include the solid waste collection, the drop-off center and the municipal incinerator. In 1990, the operating expenses for this total operation was 2.3 million dollars. In addition, a total of 137 thousand dollars was spent on capital outlay items necessary for the operation. This amount was partially funded by a State of Wisconsin
Department of Natural Resources Recycling Grant in the amount of 61 thousand dollars. All other funding came from the City tax levy. The City solid waste collection crew consists of twelve individuals operating six trucks on established routes. Appendix B includes a complete detail of the above related costs with a breakdown of personal services, including salary costs and related fringe benefit expenditures; contractual services mainly for truck usage; supplies and materials; and other expenses which include incinerator tipping fees and fees for ash disposal at the landfill. The expenses associated with solid waste collection and the drop-off center do not include any administrative or support services. Also included is the revenue to the incinerator collected as tipping fees and monies generated from sale of recyclables collected. The net cost of solid waste collection and disposal under the method currently used is 126.43 dollars per ton.

DROP-OFF CENTERS

Drop-off centers, often referred to as multi-material collection centers, are stationary sites where residents bring recyclable materials. The basic concept behind drop-off centers is the separation of the materials occurring at the source, the homeowner. Source separation would be required of paper, motor oil, tires, lawn refuse, plastic, glass, aluminum, and tin and metal cans. All other solid waste would be combined to be picked up on the regular solid waste collection day. The items that would be
included as recyclables must take into consideration the mandates designated by the State as well as the marketability of the items collected. Specifically, some items may not be mandated, but may have market potential.

The basic operation of the drop-off center can be a site where recyclables are dropped off and sorted by the individual into bins, or operated as a buy-back center, where individuals are paid a token amount of money for turning in recyclable materials. Buy-back centers have successfully recovered 63.6 percent of all aluminum cans around the country, according to the Can Manufacturer's Association, Washington D.C. and The Aluminum Association. "The percent of aluminum cans collected increased from 27.4% to 54.6%" (Misner, 1989, p. 75) during the past ten years. The Association cites a goal for the nineties of "more than 75% reclaimed" (Misner, 1989, p. 75). The materials brought to the center are stored until the items are marketed. For communities needing greater flexibility in location and time of operation, drop-off centers can be mobile, using the facility at different locations on different days of the week.

Dependent upon the number of centers and the amount of materials collected, the expense involved should be minimal. The initial establishment of the centers, including the land and building necessary, the collection bins, a baler, pallet jack and can crusher would involve major capital outlays. The operating expenses will be greater in the buy-back
center alternative due to the staffing of the center. Operated strictly as a drop-off center, it would be necessary to have the facility minimally staffed at all times, while the buy-back center would require constant staffing at a level to meet the needs of the residents. Equipment maintenance and upkeep would also be an operating expense.

The major advantage to this type of collection center is the ability to collect a wider variety of materials. Another advantage, the limited amount of expense for this form of collection, is due to the need for less equipment and labor. Drop-off centers are most successful when located conveniently to populated areas and on well traveled routes. Studies prove that most residents will bring materials to a site located within a five mile radius of their home. One disadvantage of the drop-off centers is that it is difficult to get people to take the time and make the effort to prepare, store, and transport the recyclables to the drop-off center. Buy-back centers offer an opportunity for a return to the homeowner for the inconvenience of having to clean and store the recyclables until bringing them to the center. The added incentive of a return can increase participation. Another disadvantage of offering collection of recyclables through drop-off and buy-back centers is that "people who do not have cars or other forms of transportation will not turn in recyclables" (Soloman-Hess, 1991, p. 52).
According to the United States EPA, "drop-off centers are the most common form of collection for households" (Keep, 1990, p. 14). Although this type of center may be the most common, the volume of materials collected is considerably lower in comparison to curbside collection as is the participation rate. The facilities that are operational have been successful, although normally they are found in areas that have never had a solid waste collection service, basically located in rural areas. The Village of Woodridge, Illinois, with a population of 20,000 residents, operates a successful drop-off center. The benefit considered to be the major asset is location. The center is "sandwiched between the library, post office, the police station, and a popular soccer field" (Misner, 1990, p. 94), making it extremely convenient for residents to participate voluntarily.

The drop-off center currently utilized for yard waste collection and recyclables could be extended to the collection site for all recyclables. This site was purchased by the City in 1988 and includes a large garage storage-type building. The initial purchase price and monies expended to upgrade the property to be suitable for the purpose intended were financed through the capital improvements program. The Solid Waste Coordinator for the City is convinced that since residents are accustomed to already bringing their yard waste to this site, the addition of recyclables would not be a hardship. Storage of
recyclables collected at this site would not be possible. Due to size limitations, recyclables collected would have to be stored at another facility. The argument of having a site within five miles of every residential property is a valid point. The response to this need is that there are available centers within this radius, although the other centers are privately operated, rather than municipally operated centers. Appendix C contains a listing of privately operated centers and a map noting the location of each facility in the City.

The extension of collecting all recyclables at the drop-off center would increase total City expenditures; specifically, capital outlay for a storage facility and operating costs including additional labor and associated fringes. The center has two full time employees and other employess that are utilized during the summer months. During the time period of May through October, total employees at the center increase to seven, with some of the added individuals working as seasonal and extra help. The addition of these employees is considerably less expensive than full time City employees. Normally for college students hired for the summer, the wage is tied to the minimum wage and the employees receive no benefits. The center is currently open three days per week; Tuesday, Thursday and Saturday. In order for the center to collect and process recyclables, it will need to be open more hours requiring additional employees permanently assigned to the
center. The present expenditures for solid waste collection would continue, although due to the separation of recyclable materials, the volume collected should decrease and potentially require less labor, trucks and tipping charges. It is estimated that the drop in solid waste could be as high as 50 percent, although in this calculation, a more conservative estimate of 25 percent decrease will be used. The figure in Appendix D is the composition of solid waste revealed in a study conducted by Franklin Associates, Ltd. for the United States EPA. This composition of solid waste is utilized to calculate quantities of marketed recyclables. It is also practical to estimate that some of the expenses will be recovered through sale of the recyclable materials. Appendix E outlines the cost estimates for operational expenses for curbside solid waste collection drop-off center and municipal incineration, as well as a conservative estimate of revenue collected, resulting in collection and disposal costs of all solid waste to be 146.90 dollars per ton under the drop-off alternative.

CURBSIDE COLLECTION

Curbside collection is generally a more effective method to collect recyclables when designed and promoted according to a community's demographics. Although it is more costly, the total quantity of recyclables collected is considerably higher. Participation increases in areas where the recyclable materials are collected on the same day as regular solid waste pick up versus areas where recyclable
collection is a complete separate activity. Collection of recyclables on the same day, often referred to as an integrated program, is also more economical.

Curbside collection of solid waste and recyclables can be achieved in a variety of methods. Methods requiring residents to separate recyclables from regular solid waste has been successful in many areas. Residents can separate recyclables into bins designated for each type of material, commingling the materials into a single bin or placing the recyclable materials into a separate bag from the regular solid waste. The recyclables would be picked up at the curb by collection crews. Depending upon the method and equipment utilized, the materials would be sorted at the curb or taken to a material recovery facility (MRF) for separation.

Stackable bins or those with dividers are gaining popularity in communities where contamination avoidance is a priority. Participation is also higher if residents are provided special containers. The brightly colored bins normally provide incentive in predominantly middle class communities. Peer pressure is created in neighborhoods where the bins are put out for collection. The bins can be a major expense for a community, as well as the question of replacement of bins that are stolen or damaged. Cities that initially provide the bins find it too expensive to offer replacements for free as well. Options available to communities that do not have the financial resources
available to purchase bins include: allowing residents to
designate a specific container by providing a sticker
identifiable to collection crews; working with a local
merchant who will sell containers at or near cost to
residents; or allowing recyclables to be placed in bags.
Dependent upon the method and extent of separation required
of the residents, multiple containers may be necessary.
Materials sorted at the curb by residents or collection
crews are taken to a storage facility until marketed.

A largely untested, yet alternative method of curbside
collection of recyclable materials requires residents to put
all recyclables in a separate bag. Communities using this
option designate either clear plastic bags or a specific
color bag to be used for the recyclables, while regular
black or another color bag is used for regular solid waste.
Both types of solid waste are collected at the curb by crews
in the same truck. The recyclables will be retrieved at the
MRF, where the designated bags will be sorted from the
regular solid waste. Referred to as blue bag recycling
programs, a controversy exists whether the program can
accomplish the same objective as traditional curbside
programs. A definite advantage, considerable cost savings,
have attracted attention to this type of program. Presently
being tested in Chicago, Pittsburgh, Houston and several
smaller cities, early results of the pilot programs have
been more successful than anticipated. A major concern of
this method of co-collection is spoilage of the recyclable
materials. "As far as marketing the recovered materials, they won't be anywhere near the quality you would find with a conventional (bin) system" (Sloane, 1990, p. 2). In the Chicago pilot program, "only 1% of the bags have broken in the compactors and 10% of the materials has been spoiled" (Sloane, 1991, p. 30). Industry spokesmen estimate that the spoilage rate in a conventional bin system are about one percent, so the blue bag system appears to be working against the basic principal of returning materials for reuse. The cost to residents of buying bags may have an effect on participation.

The City of Chicago cites costs savings as the major advantage to the blue bag system. The traditional bin collection system requires up-front capital costs of the bins, the recycling trucks, and additional collection crews. The city tried a pilot program of curbside bin separation and collection of recyclables, but found it was expensive, "costing as much as $700 a ton" (Sloane, 1990, p. 2). Chicago has chosen to build a series of MRFs where the materials will be sorted. Pittsburgh, using the blue bag program, with approximately one third of the City recycling, is contracting with a private intermediate processing center to sort the recyclables. The City "is achieving a 70% participation rate" (Sloane, 1991, p. 30) according to Maribeth Rizzuto, the City's Recycling Coordinator. Houston's program is being tested on 19,000 households by a private contractor, Browning-Ferris Industries. Mr. Mike
Meagher, Browning—Ferris Industries manager for the southwest region notes glass is excluded from blue bag collection. "Glass is collected separately in drop-off centers due to the potential for spoilage of the other materials" (Sloane, 1991, p. 30). The separate collection of glass adds back costs previously thought saved through the blue bag program.

The materials collected at the curb are transported to a MRF. MRF's are centralized facilities that receive, separate, process and market recyclable materials. They can be designed to process separated materials or commingled recyclables. Normally, materials are processed according to the demands of local users and brokers. MRF operators can control the quality of goods through a great degree of separation, as well as control the quantities within certain specifications for marketing. Generally, MRF's are most successful when large numbers of different recyclables are collected. Dependent upon the design, the facility can handle all types of recyclables or certain categories. Due to the large initial capital investment, these facilities will be more beneficial when utilized by more than one community, especially if the community is small. The ability to pool recyclable materials allows for uniform processing of materials that are available for marketing as well as larger quantities.

Most MRF's are designed with a tipping floor, where the collection vehicles are unloaded. The recyclable materials
are then loaded onto a conveyor by front end loaders. Different methods of handling the recyclables from the conveyor exist. Some facilities utilize inspectors at the initial stage to pull off large pieces of cardboard or any noticably contaminated material. On the conveyor, materials travel onto a second level, from which point numerous levels of separation are completed. Separation is accomplished through a combination of manual labor, magnets and trommels. MRF's planned for the future will utilize robots. Normally, materials travel to areas referred to as sorting rooms, with the first area separating corrugated cardboard, plastics, and removing nonrecyclables from the waste stream. The remaining materials are conveyed to the first of two trommels. The initial trommel separates the bottles and cans, as well as a great deal of paper. The materials dropped through the trommel travel by another conveyor that passes through a magnetic field. At this point, the ferrous cans are removed. The conveyor continues into another sorting room, where glass is sorted by color and aluminum cans are removed by manual sorters. The final trommel on the line is designed to remove broken glass and other nonsorted materials from the mixed paper waste. This area also utilizes manual sorters. The final step for the sorted materials is processing. Processing includes baling of paper, cans and plastic, as well as glass crushing. The processing step adds additional expense due to the equipment needed.
Most problems at MRF's seem to revolve around the amount of paper in the waste stream. The abundance of paper has an adverse effect on every level of operation. Facilities experiencing breakdowns that contain only one conveyor line force a total stop in processing, resulting in many newer facilities built with two separate conveyor lines.

Curbside collection of recyclables will bring many additional expenses to the City of Sheboygan due to the need for new collection vehicles. All vehicles owned by the City of Sheboygan are owned by the Motor Vehicle Department, operated as a internal service fund. An internal service fund is "used to account for the financing of goods or services provided by one department or agency to other departments or agencies of a government on a cost reimbursement basis" (Government, 1988, p. 268). The Motor Vehicle Department purchases and maintains the vehicles, while receiving an hourly rental rate from other areas of the City using the vehicle. The rental rates are broken down into two areas; one area in which the department can recover the cost of the vehicle and maintenance, including fuel and insurance costs during the useful life; and a replacement factor that will allow for the Motor Vehicle Department to have recovered enough money to replace the vehicle with a similar vehicle at the end of the useful life. All of the above-mentioned methods of curbside collection of recyclables would necessitate new vehicles;
the difference would be the type of vehicles utilized. It is assumed that if curbside collection is implemented, all waste would be collected on the same day by the same crew in new collection vehicles. All other factors currently relating to collection of solid waste would remain similar. Studies in other areas have proven that due to the additional sorting required at the time of the curbside collection, crews can not accomplish the same number of residential pick-ups, normally experiencing a twenty percent reduction. Currently, the collection crews have a four day route system, with the fifth day utilized for newly-annexed areas considerably outside the normal collection routes. On the fifth day, only two crews are utilized, involving four employees and two trucks. The other eight employees are assigned to different areas on the fifth day. It is assumed that this may no longer be possible, that the total solid waste collection crew would be utilized on the fifth day. This change will increase costs due to the additional vehicles and employee labor costs. A decrease in the incinerator tipping fee will be realized due to the drop in volume of solid waste, as well as a decrease in the landfill ash disposal.

Curbside collection of recyclables will necessitate the City to establish a materials recovery facility or some type of storage facility for the recyclables until they are marketed. The additional costs for the land and inside storage facility if the materials are sorted at the curb
would be considerably less than if the materials are collected utilizing the blue bag option. The materials recovery facility, complete with conveyors and additional equipment and labor for sorting the materials, would be necessary under the blue bag method of collection. Appendix F details the necessary outlay items as well as operating expenditures anticipated for curbside collection under the various alternatives. Under the alternative of curbside collection of solid waste, the annual cost per household varies according to the method implemented for separation. Providing bins to the residents would result in an additional capital outlay of nine dollars per residential unit or a total of 145 thousand dollars. Curbside collection utilizing bins would result in a per ton charge of 166.64 dollars, while implementation of the blue bag collection system would equate to 188.77 dollars per ton. These costs per ton calculations include the capital outlay necessary for the storage or material recovery facility. The increase in the cost per ton for the blue bag alternative is due to the additional employees required to operate the material recovery facility as well as a reduction in anticipated revenue to allow for a ten percent spoilage rate.

**PRIVATIZATION**

Privatization of solid waste collection involves the contracting out of collection and disposal services to private companies, rather than utilizing municipal
collection crews. Privatization could be accomplished through two methods; contract collection and private collection. Contract collection defines an arrangement in which the public governing body enters into a contract with a private company to provide collection services that is provided through the municipalities tax levy. Private collection applies in situations where residents enter into a contract and pay private collectors directly.

Privatization of municipal solid waste collection has increased dramatically, to the extent of achieving a dominant role in the waste collection process. Most municipalities find the financial requirements necessary to equip and operate solid waste collection to meet environmental regulations as well as State mandates, beyond the ability to raise the needed funds. Budgets become increasing tighter, while the demand for services are escalating. While municipal solid waste collection has no need to consider earning a profit or paying income taxes, these factors may be the downfall of the operation. The motivation to make a profit is often the single most effective element in many efficiently run private companies. Studies completed in 1970, 1983 and 1987 by Columbia University researchers, found that on the average "refuse collection by private contractors cost from 28% to 40% less than what public agencies would spend for comparable service" (Peters, 1991, p. 25). The National Solid Wastes Management Association has "estimated that private companies
today account for more than 80% of the refuse collected nationwide. This dominant role in the waste collection process is due to costs, pure and simple (Peters, 1991, p.24).

The advantage associated with privatization of solid waste collection is simply lower costs. In addition, accountability is a factor that exists with private contracting that is nonexistent within the municipal crews. If the private contractor does not perform as specified, the contract is in jeopardy, while if the municipal collection crew does not perform as specified, the City as an employer can reprimand the employee, but the work is either not done correctly or must be redone, adding extra costs. The disadvantages of privatization include loss of control on the part of the municipality, as well as potential cut backs in services and reduced quality of service. The initial contracts may produce cost savings, but the renegotiation of the contracts upon expiration may yield unpleasant rate increases. The collection vehicles owned by the City of Sheboygan are old and would be eliminated from the City's fleet. This factor has a adverse effect on the contract renegotiations, locking the future of solid waste collection into privatization.

It is assumed that privatization of the solid waste collection by the City of Sheboygan would be done through a contract with a private firm by the City, rather than having individuals contract separately with the hauler. This
option would eliminate the need for City collection vehicles, as well as the costs associated with the incinerator. The contracted firm would be responsible for collection of all solid waste, disposal of regular solid waste, and separation, processing and marketing of recyclable materials. Table 1 details potential costs of contracting privately for this alternative method. The detailed cost information is based on contracts entered into by local surrounding municipalities with three different private haulers. The most expensive contract results in a per ton charge of 147.37 dollars.

<table>
<thead>
<tr>
<th>MUNICIPALITY</th>
<th>CONTRACTOR</th>
<th>CITY OF SHEBOYGAN PRICE</th>
<th>RESIDENTIAL UNITS</th>
<th>PROPOSED COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VILLAGE OF KOHLER</td>
<td>WASTE MANAGEMENT</td>
<td>$2.30</td>
<td>16,150</td>
<td>$1,931,540</td>
</tr>
<tr>
<td>CITY OF PLYMOUTH</td>
<td>E &amp; K GENERAL HAULING</td>
<td>$2.65</td>
<td>16,150</td>
<td>$2,225,470</td>
</tr>
<tr>
<td>CITY OF SHEBOYGAN FALLS</td>
<td>LARRY’S HAULING</td>
<td>$2.50</td>
<td>16,150</td>
<td>$2,099,500</td>
</tr>
</tbody>
</table>

NOTE - All Contract Price per Residential Unit

SOURCE: VILLAGE OF KOHLER CLERK
CITY OF PLYMOUTH CITY ATTORNEY
CITY OF SHEBOYGAN FALLS CLERK
RECOMMENDATION

The most economical solution to solving the solid waste solution in the City of Sheboygan is to utilize the current drop-off center and expand to include collection of recyclables. As demonstrated in the comparison of alternatives accumulated in table 2, the drop-off center alternative results in a 47 cent per ton savings over privatization. The actual difference in cost between the drop-off center and privatization is minute. Numerous other considerations must be taken into account to make a valid decision. The author believes that privatization is the better choice due to the factors outlined that have a cumulative effect on total management of solid waste.

<table>
<thead>
<tr>
<th>CITY OF SHEBOYGAN SOLID WASTE COLLECTION COMPARISON OF ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATING COSTS</td>
</tr>
<tr>
<td>$2,322,368</td>
</tr>
<tr>
<td>$2,310,348</td>
</tr>
<tr>
<td>$2,464,844</td>
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<tr>
<td>$2,841,834</td>
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<tr>
<td>PRIVATIZATION</td>
</tr>
</tbody>
</table>

NOTE - All Price Estimates based on 1990 Prices
1990 City Solid Waste Tonnage of 15,101.15 Assumed
LABOR CONTRACTS

The City currently has a labor contract with AFSCME Local 2039. This contract establishes rate of pay in addition to fringe benefits and separation benefits. The current contract, in effect through December 31, 1991, has an addendum that established the work schedule and job classifications for the recycling/drop-off center. The contents of the original contract, which has been in effect since January 1, 1990, does not specify the work to be performed, nor does it prevent the City from privatization of any functions currently performed by union members. The City, in negotiations for the contract to be effective January 1, 1992, has an opportunity to remove the addendum regarding the drop-off center.

Concerns regarding potential expenses for separation benefits for employees involved is not of major proportion. The City has funded all accumulated sick leave and vacation earned but unused for all employees. This funding is in accordance with the Governmental Accounting Standards Board Statement No. 11. The expenses are recognized annually as benefits are earned, resulting in funding available for all costs associated with separation through December 31, 1990. The addition of expenses related to the time period since January 1, 1991 would not create a financial hardship. Currently, these funds are held in retained earnings reserved for sick leave and vacation accruals. The major effect to the City would be the reduction of the cash
balances at the time of pay out. The cash is currently invested and would result in loss of interest.

**VEHICLES**

The City solid waste collection vehicles are old and in need of replacement. The internal service fund which own the vehicles has cash available to finance the replacement of the collection vehicles, but this would substantially drain cash reserves, leaving an undesirable situation. Any other major breakdowns or incidents could force financial disaster. The Motor Vehicle Department had been in a poor financial situation for quite sometime prior to 1989. At that point, utilizing better planning as well as acknowledging true costs and actual usage of vehicles, the system used for rental rate calculation was redefined, resulting in an improved financial position. Replacement of many vehicles has been delayed due to lack of funding, resulting in an aged fleet of vehicles.

Other than solid waste collection, these vehicles are utilized for plowing operations during the winter months. The Motor Vehicle Department own numerous vehicles in the present fleet. If the decision is made not to replace the collection vehicles, as other vehicles are replaced, consideration would have to be made to allow for the new vehicles to be equipped for plowing. Until the time when there are enough replacement vehicles, the vehicles currently used for collection that are in the best condition could be maintained.
Vehicles purchased in the future for the Motor Vehicle Department will have to take into consideration the amount of air pollution released. Due to the United States Environmental Protection Agency requirements for the Sheboygan County area to limit pollution from petroleum products, reduction of the fleet at this time would assist in the efforts to clean up the air.

**INCINERATOR**

The municipal incinerator is not meeting the regulations established by the Clear Air Act. The structure of the tipping floor is in serious destructive condition, while the concrete and reinforcements are suffering from degradation and extensive corrosion. The total project cost of "14.8 million dollars to continue burning trash" (Fairbanks, 1991, p. 1) and bring the plant within regulation is money the City does not have available to invest in a 26 year old structure. R. W. Beck & Associates, a consulting engineering firm hired to assess the incinerator states that "new air quality standards will force the City to spend that much money to bring its municipal incinerator into compliance" (Fairbanks, 1991, p. 1). The unfortunate reality is that even if the City would invest the funds, there are no regulations at this time that are set in stone. Without established regulations, it is difficult to make any decisions to invest funds, considering that the work may be deemed unacceptable. A considerable amount of pressure is being applied by local
municipalities to the United States EPA and the Wisconsin Department of Natural Resources, but as of this writing, no real results.

**STORAGE FACILITIES AND MATERIAL RECOVERY**

The City would be forced to purchase additional land with some type of storage facility under the drop-off and curbside collection alternatives. It is assumed that a similar site to the current drop-off center would require a two hundred dollar capital outlay. Under the blue bag program alternative, a material recovery facility would be required. The estimates for these facilities range widely in price. Studies have proven that it is not conceivable for the City of Sheboygan to build and operate a material recovery facility for the amount of solid waste produced. In order for a material recovery facility to be cost effective, it is necessary for the City to sell this processing service to other communities. The three largest communities surrounding the City have all privatized solid waste collection. The calculations in Appendix F for the blue bag alternative are based on a downsized material recovery facility. These facilities are growing in popularity among the public and private sectors for moderate volume recycling, with the capability of "receiving and sorting up to 20 tons of commingled recyclables per eight hour shift" (Culviner, 1991, p. 81). The smaller facilities consist of variable speed conveyors, air classification equipment and variable speed shaker screens. This facility
should adequately handle the recyclable materials collected through a blue bag program operated in the City. The basic equipment price of ninety-nine thousand dollars is considerably more affordable than a full scale facility. Any facility owned would have to be equipped with processing equipment, such as a baler, pallet jack and can crusher, resulting in an additional capital outlay estimated to be one hundred thousand dollars.

MARKETS

The limited amount of materials collected from the 16,150 residential households limits marketing potential. The City must go through a competitive bidding process that is time consuming. Too often, by the time this process is complete, marketing chances may be missed. The private sector has more opportunities and experience in marketing recyclables. In addition, due to their client base, the amount of materials available will produce a volume more often sought by users of recyclables. During an interview with the owner of Sheboygan Waste Material Co., a local firm that handles recyclables, it was stated that prices change every day. Four years ago when the firm became involved in the recycling business, prices were considerably higher. During the past four year period, market prices for recyclables have been on a roller coaster, continually creeping up and down, without any real direction.

Mr. Paul Weigner, District Representative for the Wisconsin Department of Natural Resources office in
Milwaukee, commented in a telephone conversation that recycling markets are tied to the state of the economy. It is his belief that markets in the next two years will not improve significantly, rather they will probably decline. Wisconsin Act 335 "establishes programs that provide loans, loan guarantees, grants and rebate for various activities that are expected to stimulate the development of markets for recycled and recyclable materials" (Wisconsin, 1990, p. 25). In addition, the Wisconsin Department of Natural Resources is directed to establish priorities for the development of markets. These priorities will be utilized in the administration of the recycling loans and manufacturing rebates. As of this writing, no priorities have been established by the Wisconsin Department of Natural Resources and no loans, grants or rebates have been committed.
CONCLUSION

The decision to privatize solid waste collection will not be popular. The Mayor and Common Council members, all elected officials, will take a considerable amount of pressure from the union and taxpayers. This decision may result in loss of positions in the next election; yet these people are elected to represent the masses, not specific groups. In this case, the fiduciary responsibility they are given by the people they represent leave them no choice but to choose privatization.


APPENDIX A

INCINERATOR SOLID WASTE BURNED
CITY OF SHEBOYGAN
INCINERATOR SOLID WASTE BURNED

<table>
<thead>
<tr>
<th>Incinerator Tonnage</th>
<th>1990</th>
<th>1989</th>
<th>1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1,524.02</td>
<td>1,682.41</td>
<td>2,142.86</td>
</tr>
<tr>
<td>February</td>
<td>1,282.00</td>
<td>1,242.45</td>
<td>2,089.85</td>
</tr>
<tr>
<td>March</td>
<td>1,428.80</td>
<td>1,443.50</td>
<td>2,274.50</td>
</tr>
<tr>
<td>April</td>
<td>1,563.03</td>
<td>1,048.26</td>
<td>1,910.17</td>
</tr>
<tr>
<td>May</td>
<td>1,743.27</td>
<td>1,350.31</td>
<td>2,707.94</td>
</tr>
<tr>
<td>June</td>
<td>1,691.28</td>
<td>1,652.68</td>
<td>3,036.18</td>
</tr>
<tr>
<td>July</td>
<td>1,701.28</td>
<td>1,521.98</td>
<td>2,617.69</td>
</tr>
<tr>
<td>August</td>
<td>1,792.46</td>
<td>1,797.77</td>
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</tr>
<tr>
<td>September</td>
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<td>1,504.96</td>
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</tr>
<tr>
<td>October</td>
<td>1,819.52</td>
<td>1,572.70</td>
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<tr>
<td>November</td>
<td>1,554.43</td>
<td>1,644.40</td>
<td>1,902.11</td>
</tr>
<tr>
<td>December</td>
<td>1,282.98</td>
<td>1,330.83</td>
<td>1,483.62</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18,950.26</td>
<td>17,792.25</td>
<td>27,219.92</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solid Waste Collection</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1,264.23</td>
<td>1,313.99</td>
<td>1,110.16</td>
</tr>
<tr>
<td>February</td>
<td>974.04</td>
<td>946.85</td>
<td>1,043.80</td>
</tr>
<tr>
<td>March</td>
<td>1,135.47</td>
<td>1,072.23</td>
<td>1,331.02</td>
</tr>
<tr>
<td>April</td>
<td>1,223.14</td>
<td>785.21</td>
<td>1,457.71</td>
</tr>
<tr>
<td>May</td>
<td>1,370.42</td>
<td>1,033.21</td>
<td>1,721.32</td>
</tr>
<tr>
<td>June</td>
<td>1,285.95</td>
<td>1,360.25</td>
<td>1,712.99</td>
</tr>
<tr>
<td>July</td>
<td>1,360.16</td>
<td>1,287.36</td>
<td>1,446.01</td>
</tr>
<tr>
<td>August</td>
<td>1,417.74</td>
<td>1,477.81</td>
<td>2,236.54</td>
</tr>
<tr>
<td>September</td>
<td>1,255.19</td>
<td>1,238.51</td>
<td>1,625.93</td>
</tr>
<tr>
<td>October</td>
<td>1,436.27</td>
<td>1,348.60</td>
<td>1,587.41</td>
</tr>
<tr>
<td>November</td>
<td>1,289.36</td>
<td>1,292.22</td>
<td>1,552.48</td>
</tr>
<tr>
<td>December</td>
<td>1,089.18</td>
<td>1,016.51</td>
<td>1,159.62</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15,101.15</td>
<td>14,172.75</td>
<td>17,984.99</td>
</tr>
</tbody>
</table>

NOTE** Reduction due to elimination of yard waste in 1989

SOURCE: City of Sheboygan Finance Department
APPENDIX B

STATEMENT OF REVENUE AND EXPENDITURES

SOLID WASTE COLLECTION
<table>
<thead>
<tr>
<th>OPERATING EXPENDITURES</th>
<th>SOLID WASTE COLLECTION</th>
<th>DROP-OFF CENTER</th>
<th>INCINERATOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Services</td>
<td>$433,436</td>
<td>$161,516</td>
<td>$507,153</td>
<td>$1,102,105</td>
</tr>
<tr>
<td>Contractual</td>
<td>247,030</td>
<td>71,150</td>
<td>199,126</td>
<td>517,306</td>
</tr>
<tr>
<td>Supplies/Materials</td>
<td>1,607</td>
<td>758</td>
<td>4,858</td>
<td>7,223</td>
</tr>
<tr>
<td>Other Expenditures</td>
<td>457,945</td>
<td>55,023</td>
<td>182,766</td>
<td>695,734</td>
</tr>
</tbody>
</table>

Operating Expenses 1,140,018 288,447 893,903 2,322,368

Capital Outlay 63,852 34,966 39,043 137,861

<table>
<thead>
<tr>
<th>REVENUE</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal Recycling Grant</td>
<td>61,216</td>
<td></td>
<td>61,216</td>
</tr>
<tr>
<td>Payment for Services</td>
<td>5,930</td>
<td></td>
<td>5,930</td>
</tr>
<tr>
<td>Sale of Recyclables</td>
<td>17,311</td>
<td></td>
<td>17,311</td>
</tr>
<tr>
<td>Tipping Fees</td>
<td></td>
<td>466,592</td>
<td>466,592</td>
</tr>
</tbody>
</table>

Total Revenue $5,930 $78,527 $466,592 $551,049

NET EXPENSE $1,134,088 $209,920 $427,311 $1,909,180

City Solid Waste Collection/Tons 15,101.15

Net Cost Per Ton $126.43

SOURCE: City of Sheboygan Finance Department
APPENDIX C

PRIVATELY OPERATED RECYCLING CENTERS
CITY OF SHEBOYGAN
PRIVATELY OPERATED RECYCLING CENTERS

McLaughlin Metals, 2263 Calumet Drive, Sheboygan, WI
(Aluminum, tin, glass (bottle), plastics (soft),
copper, brass, newspaper)

RCS Recycling Center, 1535 Geele Avenue, Sheboygan, WI
(Aluminum)

Sheboygan Scrap Metals, 2801 N. 21st St., Sheboygan, WI
(Copper, brass, lead, aluminum, radiators, steel)

Sheboygan Waste Material, 1205 Illinois, Sheboygan, WI
(Plastic bottles, aluminum, metal, newspapers, glass)

Wisconsin Recycling, 1331 Erie Avenue, Sheboygan, WI
(Newspaper, office paper, cardboard, glass (bottle),
plastic (soft), tin cans, aluminum)

Wisconsin Recycling, 2923 S. 31st Street, Sheboygan, WI
(Newspaper, office paper, cardboard, glass (bottle),
plastic (soft), tin cans, aluminum)

The color coding next to the buy-back center denotes location on map.
APPENDIX D

MUNICIPAL SOLID WASTE BY MATERIALS
CITY OF SHEBOYGAN
CALCULATION OF SOLID WASTE BY MATERIAL

<table>
<thead>
<tr>
<th>Solid Waste By Weight</th>
<th>1990 City Solid Waste</th>
<th>25% Recovery Recyclables</th>
<th>Burnable Solid Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yard Waste</td>
<td>17.60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td>8.50%</td>
<td>0.10303</td>
<td>1,555.88</td>
</tr>
<tr>
<td>Glass</td>
<td>7.00%</td>
<td>0.08485</td>
<td>1,281.31</td>
</tr>
<tr>
<td>Plastics</td>
<td>8.00%</td>
<td>0.09697</td>
<td>1,464.35</td>
</tr>
<tr>
<td>Other</td>
<td>11.60%</td>
<td>0.14061</td>
<td>2,123.31</td>
</tr>
<tr>
<td>Food Waste</td>
<td>7.40%</td>
<td>0.08970</td>
<td>1,354.53</td>
</tr>
<tr>
<td>Paper</td>
<td>40.00%</td>
<td>0.48485</td>
<td>7,321.77</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>15,101.15</td>
<td>2,905.83</td>
</tr>
</tbody>
</table>

Note: Yard Waste excluded from calculation
Not part of the 15,101.15 City Solid Waste
APPENDIX E

PROJECTED STATEMENT OF REVENUE AND EXPENDITURES

DROP-OFF CENTER ALTERNATIVE
# City of Sheboygan

## Solid Waste Collection

### Projected Revenue and Expenditures

#### Drop-Off Center Alternative

<table>
<thead>
<tr>
<th>Operating Expenditures</th>
<th>Solid Waste Collection</th>
<th>Drop-Off Center</th>
<th>Incinerator</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Services</td>
<td>$350,003</td>
<td>$370,070</td>
<td>$507,153</td>
<td>$1,227,226</td>
</tr>
<tr>
<td>Contractual</td>
<td>199,495</td>
<td>88,938</td>
<td>199,126</td>
<td>487,559</td>
</tr>
<tr>
<td>Supplies/Materials</td>
<td>1,298</td>
<td>948</td>
<td>4,858</td>
<td>7,104</td>
</tr>
<tr>
<td>Other Expenditures</td>
<td>369,825</td>
<td>68,779</td>
<td>149,855</td>
<td>588,459</td>
</tr>
<tr>
<td><strong>Operating Expenses</strong></td>
<td><strong>920,621</strong></td>
<td><strong>528,735</strong></td>
<td><strong>860,992</strong></td>
<td><strong>2,310,348</strong></td>
</tr>
<tr>
<td>Capital Outlay</td>
<td>300,000</td>
<td></td>
<td></td>
<td>300,000</td>
</tr>
</tbody>
</table>

### Revenue

<table>
<thead>
<tr>
<th></th>
<th>City Solid Waste Collection/Tons</th>
<th>Net Cost Per Ton</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$4,448</strong></td>
<td><strong>$146.90</strong></td>
</tr>
<tr>
<td><strong>Net Expense</strong></td>
<td><strong>$916,173</strong></td>
<td><strong>$1,218,401</strong></td>
</tr>
</tbody>
</table>

#### Assumptions:
- 25% reduction in tonnage from Appendix 4
- Increase sale of recyclables by 25%
- Increase personnel at Drop-Off Center to Six
CITY OF SHEBOYGAN
SOLID WASTE COLLECTION
PROJECTED REVENUE AND EXPENSES
CURBSIDE BIN COLLECTION

<table>
<thead>
<tr>
<th>OPERATING EXPENDITURES</th>
<th>SOLID WASTE COLLECTION</th>
<th>DROP-OFF CENTER</th>
<th>INCINERATOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Services</td>
<td>$500,118</td>
<td>$161,516</td>
<td>$507,153</td>
<td>$1,168,787</td>
</tr>
<tr>
<td>Contractual</td>
<td>285,035</td>
<td>71,150</td>
<td>199,126</td>
<td>555,311</td>
</tr>
<tr>
<td>Supplies/Materials</td>
<td>1,854</td>
<td>758</td>
<td>4,858</td>
<td>7,470</td>
</tr>
<tr>
<td>Other Expenditures</td>
<td>528,398</td>
<td>55,023</td>
<td>149,855</td>
<td>733,276</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>1,315,405</td>
<td>288,447</td>
<td>860,992</td>
<td>2,464,844</td>
</tr>
<tr>
<td>Capital Outlay</td>
<td>445,000</td>
<td></td>
<td></td>
<td>445,000</td>
</tr>
</tbody>
</table>

REVENUE

<table>
<thead>
<tr>
<th></th>
<th>SOLID WASTE COLLECTION</th>
<th>DROP-OFF CENTER</th>
<th>INCINERATOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment for Services</td>
<td>5,930</td>
<td></td>
<td></td>
<td>5,930</td>
</tr>
<tr>
<td>Sale of Recyclables</td>
<td>4,328</td>
<td>17,311</td>
<td></td>
<td>21,639</td>
</tr>
<tr>
<td>Tipping Fees</td>
<td></td>
<td></td>
<td>365,860</td>
<td>365,860</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$10,258</td>
<td>$17,311</td>
<td>$365,860</td>
<td>$393,429</td>
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</table>

NET EXPENSE

<table>
<thead>
<tr>
<th></th>
<th>SOLID WASTE COLLECTION</th>
<th>DROP-OFF CENTER</th>
<th>INCINERATOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Solid Waste Collection/Tons</td>
<td></td>
<td></td>
<td></td>
<td>15,101.15</td>
</tr>
</tbody>
</table>

Net Cost Per Ton

$166.64

ASSUMPTIONS: Increase of 20% in Solid Waste Collection due to collection of both recyclables & regular waste
CITY OF SHEBOYGAN
SOLID WASTE COLLECTION
PROJECTED REVENUE AND EXPENSES
CURBSIDE BLUE BAG PROGRAM

<table>
<thead>
<tr>
<th>OPERATING EXPENDITURES</th>
<th>SOLID WASTE COLLECTION</th>
<th>MATERIAL RECOVERY FACILITY</th>
<th>DROP-OFF CENTER</th>
<th>INCINERATOR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Services</td>
<td>$500,118</td>
<td>$250,059</td>
<td>$161,516</td>
<td>$507,153</td>
<td>$1,418,846</td>
</tr>
<tr>
<td>Contractual</td>
<td>285,035</td>
<td>71,150</td>
<td>71,150</td>
<td>199,126</td>
<td>626,461</td>
</tr>
<tr>
<td>Supplies/Materials</td>
<td>1,854</td>
<td>758</td>
<td>758</td>
<td>4,858</td>
<td>8,228</td>
</tr>
<tr>
<td>Other Expenditures</td>
<td>528,398</td>
<td>55,023</td>
<td>55,023</td>
<td>149,855</td>
<td>788,299</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>1,315,405</td>
<td>376,990</td>
<td>288,447</td>
<td>860,992</td>
<td>2,841,834</td>
</tr>
<tr>
<td>Capital Outlay</td>
<td>400,000</td>
<td></td>
<td></td>
<td></td>
<td>400,000</td>
</tr>
</tbody>
</table>

REVENUE

| Payment for Services   | 5,930                  |                             |                 |             | 5,930 |
| Sale of Recyclables    | 19,475                 |                             |                 |             | 19,475 |
| Tipping Fees           |                        | 365,860                     |                 |             | 365,860 |
| Total Revenue          | $5,930                 | $19,475                     | $0              | $365,860    | $391,265 |
| NET EXPENSE            | $1,309,475             | $357,515                    | $288,447        | $495,132    | $2,850,569 |

City Solid Waste
Collection/Tons

Net Cost Per Ton

ASSUMPTIONS: MRF, Assume six full time employees
Reduce revenue from sale of recyclables by ten percent for spoilage allowance