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The Planning of Municipal Resource Recovery Facilities in the United States - An Analysis of Waste-To-Energy Projects in the Northeast

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The Planning Of Municipal Resource Recovery Facilities In The United States- An Analysis Of Waste-To-Energy Projects In The Northeast

by

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Dedication

For Dr. Vincent "Jake" Powers,
Who Surely Appreciates The Irony Of The Topic

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THE PLANNING OF MUNICIPAL RESOURCE RECOVERY FACILITIES IN THE UNITED STATES-AN ANALYSIS OF WASTE-TO-ENERGY PROJECTS IN THE NORTHEAST

By Alan Ira Gordon

CHAPTER ONE-INTRODUCTION

The purpose of this study is to examine the planning of municipal resource recovery projects in the Northeastern United States. Resource recovery projects generally consist of the construction of plant facilities and operating agreements for converting solid waste to energy. The energy is usually generated in the form of steam or electricity, and sold to a specific user.

This study will analyze the degree to which developing resource recovery projects constitutes "successful" municipal service planning. Three planning issue areas will be studied, in order to gauge community success in resource recovery planning. These issues are: 1) the planning for financial risk management of the project; 2) the nature of the project operating structure resulting from the negotiation process for user, operator, and energy purchasing contracts; and 3) the public decision-making process for site approval of resource recovery plants. According to planners for several Northeastern resource recovery projects, the most vital decisions of the resource recovery process occur within these three issue areas.[1]

Financial Risk Management and The Project Operating Structure

Perhaps the most important aspect of the resource reco-

very planning process is the structuring of risk management for the financial side of a project. Essentially, financial risk management consists of structuring a project's bonding terms, amortization schedule, and various revenue costs so as both to reduce the chances of fiscal default, and to distribute fiscal responsibility for the project among all parties (municipality, owner/operator, and facility users). As will be seen in Chapters Three and Six of this study, managing financial risk within a resource recovery project is interrelated with the second issue area examined-the negotiating process for user, operator, and energy-purchasing contracts. As indicated, the risk management structure agreed upon greatly influences the operating structure and the owner/operator/user responsibilities emerging from the contract negotiation process.

The Siting Issue

Analysis of a third and final issue area, the public decision-making process for the siting of resource recovery plants, is also vital for understanding the resource recovery planning process. In many cases the siting issue is noncontroversial, with facilities being located in municipal areas zoned for intensive industrial use. However, as is the case in the two projects examined in Chapters Four and Five, when resource recovery facilities are located within or adjacent to residential areas, the siting process can become adversarial in nature. In such cases, a well-planned siting process that includes a high degree of local public input can

reduce the level of planner/resident adversity, and pave the way for mutually-acceptable siting decisions.

As such, the lesson learned from the two siting failures examined in Chapters Four and Five is that several factors must be present within each plant location process for successful decision-making to occur. When these factors include the presence of a neutral mediator, development of a technical information system, and dissemination of information to all interested parties, facility siting controversies can be overcome and successful resource recovery plant siting decisions can be made.

Significance of The Resource Recovery Issue

For many reasons, the topic of municipal resource recovery is a significant subject for the attention of today's urban planners. Foremost among these reasons is the state of the resource recovery field in the U.S. today. As of April 1983, a total of 97 facilities were either in the planning stages or operating in the U.S., compared to only 52 the year before.[2] This rapid increase supports the belief that strong potential exists for resource recovery plants to serve as a viable answer to municipal waste disposal demands. Both public environmental awareness that emphasizes recycling and municipal needs for fiscally-strong public service systems are increasingly leading cities to consider resource recovery as a waste disposal alternative.

Current research on resource recovery planning is also

vital due to the relative newness of waste-to-energy projects as a disposal alternative. Development of a recovery facility is enormously difficult and complicated, and is usually the largest project that a municipality has ever undertaken. In addition, it is only in the early-1980's that the major technological "bugs" have been worked out for operating such a project on a day-to-day, near-capacity basis.

Accordingly, as the March/April 1983 issue of City Currents points out, there is a great need for research into ways by which communities can add financial stability and operational success to future recovery projects.[3] A great deal of academic and professional research needs to be done to provide assurance to waste-burdened communities that resource recovery has crossed the threshold from the experimental-model to a reliable and successful municipal facility and service. Studies such as these may serve as useful reference sources for community developers when evaluating future resource recovery needs.

Methodology

The procedure for analysis employed in this project is the comparative case study methodology. This technique has been chosen for two reasons, one being its usefulness as a method for studying the financial issues arising in resource recovery projects. To a large degree, the financial planning of any municipal project is usually geared to the criteria of both project plans and the local environment within which the

project is being structured. Comparative analysis can emphasize financial disparities between projects, while allowing for financial similarities also to be studied.

Secondly, the comparative methodology allows for a broader regional focus, applicable to studying resource recovery projects in the Northeast. Energy needs, along with the goals and objectives of planning for waste disposal systems, are unique within the communities of the Northeast as opposed to other geographic and demographic regions of the country. As such, four Northeastern resource recovery projects are comparatively incorporated into this study, reflecting both uniformity and differentiation between planning efforts.

In Chapter Two, the financial planning efforts revolving around project start-up and initial operating of resource recovery plants in two small New England municipalities are empirically portrayed. Both the Vicon, Inc. plant in Pittsfield, Massachusetts and the Consumat Systems, Inc. project in Portsmouth, New Hampshire, provide for a comparison of elements reflecting both uniformity and differentiation between projects. As mentioned above, the two examples are analyzed in Chapter Three regarding two key issues inter-related within the financial planning of the projects-the issue of risk management in funding the projects, and the degree to which a project's operating structure determines successful resource recovery planning.

Chapter Four focuses on the plant siting issue-

specifically, the nature of citizen participation in the plant siting decision-making process. Focus in this chapter is upon two controversial siting proposals for resource recovery projects. The first case, a proposed metropolitan resource recovery plant in Syracuse, New York, is reported by Bozeman and Bozeman in the Journal of Public Policy[4] (1981). Focus is next placed upon a controversial proposal by the city of Worcester, Massachusetts to site a resource recovery plant in the northern section of that city in the late-1970's and early-1980's. Empirical data from both cases are then compared, resulting in insight to the nature of citizen participation in the resource recovery planning process.

The final project chapter summarizes the findings resulting from analyses of the four case examples cited above. In conclusion, a number of specific recommendations are made regarding resource recovery planning within the issue areas of risk management, operating structure, and siting/citizen participation.

It is important to emphasize that this study does not merely portray the mechanics of resource recovery plants in and of themselves. Rather, the focal point of analysis is the process of public agency, private developer, and citizen-user participation in planning the framework for a specific municipal public service. Examination of this planning process results in a case study of alternatives toward successful implementation of a type of municipal service system, given the fiscal realities and social constraints faced by today's community developers.

The following case examples provide knowledge of relatively successful and unsuccessful waste management planning experiences, tempered by local environmental, socio-economic, and political considerations. As such, it is hoped that this project can serve as a workable planning document, which could be referred to by other municipalities in evaluating the resource recovery alternative.

CHAPTER TWO-THE FINANCIAL PLANNING AND OPERATING STRUCTURE OF TWO RESOURCE RECOVERY PROJECTS-PITTSFIELD, MASS. AND PORTSMOUTH, N.H.

THE VICON PROJECT-PITTSFIELD, MASSACHUSETTS

The Pittsfield, Mass. case represents the development of a refuse-to-energy project in a small city, in cooperation with local industry (see Appendix, figure 1). With a population of 50,000 situated in the Berkshire Mountains of Western Massachusetts, Pittsfield traditionally has relied upon landfill space for its waste disposal needs. In the early 1970's, the need for more landfill space became apparent. As there was no politically acceptable landfill site in the city, and the expansion of the existing site meant the demise of the city's only industrial park, the mayor appointed a Solid Waste Commission to investigate the matter and make short-term recommendations. The Commission's primary accomplishment occurred in 1974, with the establishment of six additional landfill acres within the industrial park.[5]

In 1975, the Commission's membership was revised and specifically charged by the mayor to investigate alternatives to solid waste disposal other than landfill and the associated costs. The Commission investigated many options, reporting in 1976 with specific recommendations which included the utilization of a modular system of refuse incinerators to produce steam which would be sold to local industry.[6]

After early attempts to involve the entire county in a

regional facility failed to interest other local communities, the Solid Waste Commission adopted the concept that Pittsfield would "go it alone." However, the capacity of the plant would be designed to accomodate both the maximum ability to sell steam, as well as the eventual inclusion of adjacent towns on a first-come, first-served basis. At the same time, the initial project financing and economics would have to be justified on the basis of Pittsfield's refuse, alone. Consequently, the Commission instituted a solid waste weighing program so that the necessary data on Pittsfield's refuse-producing capacity would be available for eventual contract negotiations. The investigation concluded with four major recommendations:

1. A refuse-to-energy plant would be a feasible disposal alternative.

2. The facility should be privately owned and operated.

3. The City should continue to pay to dispose of refuse.

4. The project should have a reasonable tax impact.[7]

It was recognized that with the increasing value of energy, the net disposal fee should not increase as rapidly as the cost of landfill. As such, the project was accepted politically on the basis that over its financial life, the total cost of disposal would be less than that of landfill.

The Consultant

The next phase in the planning process was the hiring of

an engineering consultant to evaluate the project's feasibility. $40,000 was approved by the Pittsfield City Council to engage the selected consulting firm of Metcalf and Eddy to formulate a request for proposal (RFP), which was issued in the Spring of 1978. The RFP provided for private ownership and operation of the plant, but left it up to the applicant to demonstrate fairness relative to three objectives: a "reasonable" tipping fee; a "reasonable" savings to the energy user; and a "reasonable" profit for the operator.[8]

The Energy Customer

In order to make the project a reality, an energy customer had to be identified and committed to purchase the steam generated from the refuse-to-energy process. Two of the area's largest industries were approached-Pittsfield's General Electric plant and Crane & Company of nearby Dalton, Mass., a manufacturer of fine quality paper since 1801, including all established currency paper for the U.S. government. G.E. received prime consideration due to its strong influence on the local economy (over 8,000 employees lived in Pittsfield). Yet because of the "poor fit" between G.E.'s steam requirements and the proposed project's ability to produce refuse-derived steam (RDS), this alternative was not deemed feasible.[9]

Concerning Crane and Company, the paper manufacturer had an average weekday steam load of approximately 90,000 lb./hour in the winter and 60,000 lb./hour in the summer. In

addition, the company owned four #6 oil-fired boilers with the capacity to make up any difference between refuse-derived steam and production requirements. Crane and Co. believed that if 65-70% of the company's steam requirements could be purchased, the difference to be raised by oil or gas appeared within reason.[10]

Although reservations concerning the dependability of RDS were thus overcome, an additional basic concern had to be resolved before Crane and Co. provided a committment to negotiate contract specifics. Essentially, there was a hesitancy on the part of the company to enter into a long-term contract because of the uncertainties in the energy future. The typical amortized life for such a project, twenty years, was considered too long a committment, while ten years required too rigorous an amortization schedule for project economics. A compromise was reached when it was agreed that a fifteen-year amortization schedule would be economically practical.[11]

The Negotiated Procurement Process

During the contract negotiation phase of the project, two simultaneous negotiations took place, resulting in a disposal service agreement and a steam sales contract.

The Disposal Service Agreement

During the first part of 1978, the Solid Waste Commission in consultation with Metcalf and Eddy and finan-

cial consultant Paine, Webber, Jackson, & Curtis, reviewed three submitted RFP's for technical and economic merit. In August of 1978, Vicon Recovery Associates of Lincoln Park, New Jersey, was selected on the basis of strong financial
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assets and potential lower disposal service cost to the City. Vicon contracted with Enercon Systems, Inc. of Cleveland, Ohio, for incinerator design and the manufacture of process equipment specifications.

The negotiated procurement process took approximately five months, with the City and Vicon signing a disposal contract in February of 1979. Significant terms of the agreement included the following:

1. Refuse Guarantee-the City would guarantee to deliver and pay for a minimum quantity of 600 tons of trash weekly and 44,000 tons annually.

2. A base disposal fee was set at roughly $11.50 per ton, based on actual tonnage and amortization payments, which the City pays for all waste delivered, including commercial haulers.

3. Private haulers must pay a nominal $2.00 per ton surcharge for waste delivered, in addition to the $11.50 paid for the same load by the City.

4. Profit Sharing Clause-in keeping with the original philosophy of a cooperative venture in which all three participants (City, operator, and energy user) would get a "fair deal," the disposal contract contained a profit-sharing clause. Vicon received a management fee of $100,000 in the base year of operation, to be escalated with the Boston

Consumer Price Index. Beyond payment of the management fee, the balance of the profit (total revenue less amortization, operating, and maintenance costs) is to be divided equally between Vicon and the City. As this refund is in effect a reduction on the tipping fee, it is projected that the net tipping fee will decrease to a point where it will be cheaper than landfill costs in just a few years.[13]

The Steam Sales Agreement

Agreement on a steam sales contract also was reached between Vicon and Crane & Co. in February, 1979. Under the terms of the contract, Crane agreed to purchase and Vicon guaranteed to deliver a minimum of 700,000 lb. of steam per day for 240 operating days per year. Crane also agreed to purchase all additional steam which Vicon could deliver and Crane could effectively use. Penalty payments are to be made by Vicon to Crane if steam interruption is the cause of paper machine down time. To decrease the probability of down time, a standby 35,000 lb./hour auxiliary boiler utilizing No. 6 oil fuel was installed.[14]

Concerning steam payments, the agreement stipulated that Crane's payments for steam were to be based on the price of #6 fuel oil. The replacement cost of the #6 oil which Crane would have used to produce the amount of steam sold is discounted 15 percent during the first years of the steam contract. Again, in keeping with the project philosophy of sharing benefits, this discount is to increase to 25 percent

over the 15-year-term of the agreement.[15]

Financing

Both the Pittsfield Solid Waste Commission and Metcalf & Eddy felt that private financing was the appropriate means for funding the resource recovery project, for two reasons. The first concerned political objections within the Pittsfield community regarding the risks involved in bringing the plant to a workable state of operation. Concern over project risk derived from the 1950's, when the City had financed the construction of a million-dollar incinerator. The plant had been in service for only a few years when a combination of maintenance, operational, and environmental problems forced its shutdown.[16]

Memories of this project failure, along with reluctance on the part of Crane & Co. to participate with a city-operated steam plant, led the mayor of Pittsfield to appoint an Industrial Development Financing Authority (IDFA), as provided for under statute of the Commonwealth of Massachusetts. With the IDFA holding title to the property, tax free revenue bonds guaranteed by the operator could be issued. The bond issue would include three facets-funding for plant construction, costs of financing, and a one-year bond reserve fund for added assurance to the lender. The bond issue also carried a secondary guaranty by the City of Pittsfield in the event that the operator became insolvent.[17]

A bond issue totaling $6.2 million was closed in September, 1979, from which $4.7 million was available for

construction. The 15-year amortization schedule earlier agreed upon by Crane & Co. and the City was instituted, with an interest rate of 6 to 7.5 percent calculated for repayment of the $6.2 million IDFA bond issue.[18]

Additional project funding was provided through private financing. A private limited partnership-Vicon Recovery Associates (VRA)- was formed to raise the private capital, with Vicon supplying $1.1 million in equity and acting as the general partner.[19] In all, an additional $4.6 million of working capital was obtained from the private sector. Combined public/private financing of the project totaled $10.8 million.

Operation Of The Vicon Plant

On February 6, 1981, just 15 months from the start of construction, the first incinerator in the project was fired, and by the end of March the steam generation process went on-line. From the standpoint of both the City and Vicon, the first full year of plant operation (Jan.-Dec.,1982) proved to be extremely satisfactory. Over the 12-month period, the plant received 62,193 tons of solid waste. From this, 208,783,000 lbs. of steam were sold to Crane & Co. The ratio of steam sold to steam made increased from an average of 80% during the first nine months of 1982 to an average of 96% during the last three months of the year.[20] An additional indicator of project success can be seen in a steady reduction of the tipping fee. The initial tipping fee, set at

$11.68, was reduced to $11.65 at the beginning of 1982, $11.56 in 1983, and $11.52 in January of 1984.[21] This reduction has resulted from both the adequate level of solid waste received by the plant, and a positive revenue flow to the project from steam sales to Crane & Co. Thus, it can be seen that the Vicon project in Pittsfield was initially considered successful to all parties involved in the resource recovery planning process.

THE PEASE AIR FORCE BASE PROJECT-PORTSMOUTH, NEW HAMPSHIRE

In 1973, the City of Portsmouth, New Hampshire (pop. 28,000) required additional landfill space for the disposal of solid waste (see Appendix, figure 2). Unable to find a suitable location within the City limits which could receive State approval, the City entered into a long-term contract with landfill operator Coolly Company to handle the solid waste disposal outside of City boundaries. Within a few years, it became apparent that the landfill provided by Coolley would continue to meet the City's waste disposal needs for only a short period of time. As such, by 1977 the City began to examine alternative methods of waste disposal. These included development of another landfill, contracting out of disposal responsibility to a private contractor, or converting the waste to a usable material through reprocessing.[22]

While discussing the waste disposal issue with a number of students in the 1977 graduating class at Pease Air Force Base, the City learned that the Air Force relied upon a large

central heating plant which burned #6 fuel oil to heat the entire base. As Pease was located within the Portsmouth city limits, the City began to consider the alternative of developing a resource program for the burning of solid waste to produce steam, which could be sold to the Air Force.[23]

The Consultant

As Coolly Co. was interested in becoming involved in the resource recovery process for Portsmouth, the landfill contractor hired the firm of Wright-Pierce Engineers in 1978 to develop a preliminary design report. The Wright-Pierce report indicated that a 200 ton per day energy recovery solid waste incinerator could feasibly be coupled with the Pease Air Force central heating plant to supply a major portion of the base's heat demand. Wright-Pierce proposed the development of four 50-ton per day modular incinerators, with total construction costs for the project estimated at $5.5 million (1979 costs).[24]

Upon analysis of the Wright-Pierce report, Coolly Co. determined that the amount of funding involved in constructing the facility was beyond its scope, and decided to abandon the project. As a result, the City of Portsmouth decided to undertake financing of the refuse-to-energy plant, and contract directly with the U.S. Air Force for the sale of steam from solid waste.

The City's first step in the resource recovery planning process was to establish a Resource Recovery Committee,

designated by the City Council and comprised of the Mayor, Assistant Mayor, one city councilman, the city engineer, director of public works, finance director, and city manager. Three major goals were formulated by the Committee-to investigate the feasibility of the project, to develop a request for proposals, and to determine what interest there was in the private sector to build such a facility as well as preliminary cost estimates.[25] In addition, the Committee hired Mr. Ross Hoffman of Miami, Florida, to assist in both the RFP and negotiated procurement process. Mr. Hoffman would also review all plans and act as Clerk of the Works for the City of Portsmouth for the construction project.

Prior to the contract negotiation process, a number of feasibility studies further reinforced the positive aspects of contracting with the Air Force for the resource recovery plant site. The studies focused upon two components-transportation and disposal. As use of the Coolly landfill would soon no longer be feasible, the City would have to transport waste to a new site in another community. By 1983, the costs for Portsmouth to use another landfill would range from $15 to $20 per ton of waste, plus transportation. In addition, the transportation component would increase more rapidly than the disposal fee because of inflation and higher fuel costs.[26]

As such, all studies recommended that Portsmouth should try to dispose of its waste as close to the city limits as possible. The major advantage of using Pease Air Force Base was in the reduction of transportation costs. It was esti-

mated that this factor would save the City a minimum of $6 to $7 per ton of waste in 1983.[27]

The Negotiated Procurement Process

The negotiated procurement process took place from approximately December of 1979 to December of 1980, and consisted of three sets of negotiations-the RFP process, negotiations with the Air Force for a steam sales contract and facility location contract, and various service disposal contracts.

The RFP Process

A request for proposals that outlined the scope of the project was prepared by the Resource Recovery Committee and Ross Hoffman. Two engineering firms, Consumat Systems, Inc. and Vicon, Inc. responded with proposals to supply the equipment and construct the buildings and mechanicals by joint venture with another firm. Both proposals were reviewed by the Resource Recovery Committee. The Committee determined that since Vicon only operated the Pittsfield, Mass. plant and Consumat administered a number of facilities, Consumat Systems had greater experience, and voted to enter into a contract with Consumat for the design, construction, and operation of a 200 ton per day facility. As such, on November 14, 1980, the City entered into a contract with Consumat Systems, Inc. and Global Development Engineering Co., Inc. for a $5,846,000 base construction cost. Various fees, land

lease costs, and consultant fees brought the total agreed building/operating contract to $6,270,000.[28]

The Air Force Steam Sales/Site Location Contracts

While the RFP process was ongoing, the City entered into negotiations with the U.S. Air Force for a steam sales contract and an agreement for locating and constructing the resource recovery facility on Pease Air Force Base. By late-December of 1980, the City and Pease had an agreement in principle for the steam purchase, with a pricing formula tied into the costs of replacement oil fuel.

However, in mid-February of 1981, Strategic Air Command (SAC) Air Force headquarters rejected the pricing formula, stating that there was nothing in the Air Force service contract procurement regulations that permitted a contract pricing formula to be tied to the cost of alternate fuel costs. Renegotiations involving SAC, Pease Air Force Base, and Portsmouth officials began immediately. Within a few weeks SAC relented, agreeing to let stand the contract regulations as negotiated by Pease and the City.[29]

The final steam purchase agreement represented the first such contract in U.S. Air Force history. Under the terms of the final agreement, the Air Force guarantees to pay for all purchased steam based upon the current cost of producing similar heat from fossil fuel as set by the Defense Stock Fund.[30] Highlights of the steam sales agreement include the following:

1. The Air Force agreed to purchase from the City a

minimum of 236,000 MBTU's of steam per year for 10 years.

2. Cost of the steam is to be charged at the rate of 90% of the stock fund price of the fossil fuel displaced, which could be either oil or gas.

3. All revenues generated from the plant, including steam sales, tipping fees, and future revenues from any other source, would be used to pay off the bond issue and the operation and repair of the facility. Any remaining revenue balance would be accrued 60% to the Air Force and 40% to the City of Portsmouth.

4. The Air Force guaranteed that if Pease Air Force Base closes during the life of the contract (10 years), the City would be paid an amount equal to the outstanding balance of the bond issue or capital costs of the facility.[31]

In addition to the negotiated steam purchase agreement, the City obtained a twenty-year lease on the project site from the Air Base, at a cost of $12,800 per year. The site is located approximately 1,200 feet from the Pease central heating plant, and connected to it by an insulated steel steam pipe and condensate return line. In all, both the City and the Air Force were highly satisfied with the terms of the contract. Portsmouth had solved its solid waste disposal problem for a minimum of ten years, while Pease Air Force Base was able to purchase its energy at a savings, well-reducing its dependence on foreign oil.

The Service Disposal Negotiation Process

In the Spring of 1981, service disposal contracts were signed with a total of 11 facility customers, including eight towns, the Portsmouth Naval Shipyard, Pease Air Force Base, and one private waste disposal contractor. The contracts consisted of a standard 10-year-term solid waste disposal agreement signed by each customer and the City of Portsmouth. In total, the agreements stipulated that the aggregate of solid waste deliveries to the facility would total at least 1190 tons per week. Each party failing to deliver its established weekly minimum would be assessed for a proportional share of the City's loss of revenue. The tipping fee for all solid waste delivered to the facility was set at $7.50 per ton.[32]

Financing

Financing for the Portsmouth project was begun by bank borrowing. After the bond counsel had packaged a prospectus for internal review, the City of Portsmouth decided to float $6.5 million in general obligation bonds to cover the costs of constructing the facility. Special legislation was introduced in order to allow the City to extend its general obligation bond capacity to cover funding of the project. Upon approval of the special legislation, the bonds were sold in one day, on February 4, 1982, at an interest rate of 10.4 percent, with an amortization schedule set at ten years.[33]

The Financial Situation In Operation

On July 12, 1982, the transition took place smoothly for

Pease Air Force Base from usage of fossil fuel-produced energy to energy produced solely by the City's resource recovery plant. In its first year of operatuion (July 1982-July 1983), the plant processed 67,379 tons of waste, from which a total of 216,000 MBTU's of refuse-derived steam energy was purchased by Pease Air Force Base.[34]

As noted above, a major operational stipulation agreed upon in the 1980 steam sales contract was that the price of refuse-derived steam sold to Pease Air Force Base would be based upon 90% of the replacement price of Defense Stock oil or gas. The City's desire for this condition was based upon the steady rise of fossil fuel prices in the United States since the oil embargo of 1973. It was assumed by the City that fossil fuel prices would continue to rise or stay the same for several years, thus generating an assured rate of steam-derived income from the project.

However, throughout 1982-83 the fuel price trends changed dramatically, with oil/gas costs declining. Actual revenues did not live up to projected levels, resulting in a combined capital/operating debt of $580,000 for year one of plant operation. This debt trend is expected to continue, with the deficit for year two (7/83-7/84) projected to be between $800,000 and $1,000,000. With the present rate of income continuing, the City would be in a deficit position for approximately three to four years while in the process of paying off the capital debt on the facility.[35]

As a result of this fiscal strain, the City of

Portsmouth began in October of 1983 to examine ways of increasing the revenue-generating capacities of the project. In the original proposed plans for the project, the City had intended to eventually add a co-generation unit to the plant. The unit would generate electricity through turbines, using the excess steam available when the Air Force was not using full production. It was anticipated that planning for the operation would begin about the third year after initial plant construction. Due to the deficit situation, the City decided in October to move into the co-generation process immediately.[36]

After soliciting input from several consultants, the City concluded that the growing deficit situation, combined with the costs of adding a co-generation component to the project, made continuing City-ownership of the project untenable. As such, in December of 1983, the City began discussing the sale of the plant to Consumat Systems, Inc. Contract negotiations were conducted through late-January of 1984, with the forthcoming agreement to be signed sometime in the early spring. Highlights of the agreement included the following:

1. Consumat Systems, Inc. agreed to purchase the resource recovery plant and pay off all of the City's capital and operating debt.

2. Consumat agreed to enlarge the plant's waste processing capacity from 200 to 470 tons per day, and generate either electricity or steam, depending upon which market is most favorable.

3. The term of the Portsmouth/Consumat contract was set at twenty years, with the City agreeing to supply the plant with 400 tons of solid waste per day.

4. The City's role and responsibility regarding the resource recovery plant is to be that of user, only.[37]

In addition to this new agreement, new 20-year-term disposal contracts were offered to the non-City waste suppliers. The new terms raise the tipping fee from the original $7.50 per ton rate to $12.00 per ton, with a consumer price index adjustment after 1985. If any of the current waste suppliers do not wish to participate in the new contracting papers, the remaining eight years on the existing agreements will be honored. However, the additional 12 years of the new contracts will be sold to someone else immediately, at the re-negotiated disposal rates.[38]

By February, Consumat had also made arrangements to contract directly with Pease Air Force Base for the purchase of refuse-derived steam. The new contract contained an agreement on an energy floor, or minimum purchase requirement for steam that Pease must purchase and Consumat must produce. One reason for establishing this energy floor concerned the amount of steam produced by the plant in one year of operation. Although the Air Force had agreed to purchase 236,000 MBTU's yearly, initial waste shortfalls during the start-up period resulted in the production of only 216,000 MBTU's of energy.[39] It was hoped that compliance with energy floor requirements would provide assurance for both steam-producer

and user that agreed-upon steam levels would be met.

Concerning the transfer of financial responsibility for the plant, Consumat is receiving help through the New Hampshire Revenue Authority to raise funds for both a take-over of the project's operating/capital debt, and construction of the co-generation unit. The Authority is currently underwriting $20 million in industrial development revenue bonds for the project through an underwriter on the private market. The amortization period for bond repayment is to be set at 10 years.

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CHAPTER THREE-SHARING THE RISKS-ANALYSIS OF RISK MANAGEMENT IN THE PITTSFIELD AND PORTSMOUTH PLANNING PROCESSES

According to participants involved in both resource recovery projects outlined above, one of, if not the most important issues to be addressed in determining whether or not a project is successful, concerns the degree to which planners provide for adequate risk management in the financial and operating structures of each project. Planners for resource recovery in both Pittsfield and Portsmouth consider an adequate understanding of the risks involved with taking on such a complex, expensive municipal project, as well as a realistic apportioning of the risk burden among all project participants, as the key to successful, continual resource recovery.[41]

Comparison of the Pittsfield and Portsmouth projects reveals that the involved planners reached these same conclusions in two markedly different ways. From the beginning, the Pittsfield planning process was highly structured so as to minimize the possibilities of financial risk for all participants involved. On the other hand, Portsmouth project planners initially did not structure financing and operating agreements in a manner conducive to avoiding a heavy risk burden from being placed upon the City. Consequently, the initial Portsmouth operating period resulted in a serious financial deficit, jeopardizing continued management of the project in its originally-planned form. As portrayed in Chapter Two, the financial/operating structure was eventually

replanned so as to provide more adequate risk management for the project.

Risk Management And The Plant Operating Structure

Analysis of both projects reveals several operating factors that were implemented differently, resulting in alternative risk management outcomes. One basic operating factor is ownership of the resource recovery plant. Concerning Pittsfield, the City-appointed Solid Waste Commission determined at the earliest stages of planning that the facility should be privately-owned and operated, with the City's main operational role to be that of waste-disposal customer. In Portsmouth, however, when the Coolly Co. decided not to invest in resource recovery, the City itself took responsibility for eventual facility ownership. This decision placed a greater risk burden on the City itself, as the deficit situation developed.

A second operational risk management factor is the apportionment of after-cost revenues, or those revenues remaining after amortization, operating, and maintenance costs are considered. In Pittsfield, the concept of a "fair deal" for all involved in the project was basic to the adopted revenue apportionment strategy. All revenues after costs were evenly divided between the City and Vicon, Inc., the plant owner/operator. This revenue-sharing plan was not adopted in Portsmouth, however. At Pease, revenues were apportioned 60 percent to the Pease Air Force Base and 40 percent to the City, thus reducing the City's revenue share

to an unequal proportion of the whole, thereby increasing financial risk.

The operating terms of the tipping contracts also affected the risk management potential for both projects. As tipping fee income provides a major proportion of project revenue, established rates are vital in addressing the risk management issue. Pittsfield's initial tipping fee was set at a realistic rate of approximately $11.50 per ton, based upon both the constant amortization payment and the quantity of waste delivered. Portsmouth's tipping fee rate was set at an artificially-low $7.50 per ton, in part as a strategy to make resource recovery attractive to potential waste disposal customers. However, this rate would prove to be too low to cover required amortization payments and operating expenses, further risking project crisis.

In conjunction with the operating factors examined above, various financial factors must be analyzed regarding risk management and project financing. As Joseph J. Domas in Solid Waste Management has noted, the Pittsfield experience demonstrates that proper management of risk potential among operating factors can result in the development of innovative financing methods which can further limit the risk potentials accompanying investment in such projects.[42]

This view is further supported by Aldrich and Rofe of Paine, Webber, Jackson, & Curtis, Inc., who look positively upon the City's desire to share project risks with both Vicon and Crane & Co., through terms specified in the service

disposal and steam contract agreements. Both analysts contend that it was this willingness among all parties to share project risks that made financial investment in the project a lucrative option. As a result, at a time when the major commercial banks in the U.S. had raised the prime rate of interest to approximately 15 percent, the Pittsfield project was able to obtain a very attractive interest rate of 7.14 percent.[43]

As opposed to Pittsfield's successful structuring of risk management and project financing, Portsmouth's original operating factors supported a risk management situation that resulted in financial crisis. The City took too much responsibility upon itself, through its decisions to retain ownership of the plant and to rely upon city-raised general obligation bonds for project financing. These factors, coupled with the tipping fee and revenue-sharing factors already outlined, resulted in a resource recovery project in which a disproportionate risk burden was placed upon the City's shoulders. Given financial analysis of this situation, the net interest rate obtained for the project was 10.25%, placing a much higher amortization burden on Portsmouth than Pittsfield, and adding further pressure that would result in fiscal crisis.

An additional factor, the amortization period for bonding repayment, further emphasizes risk differences between projects. As 20 years was considered too long and 10 years too short a repayment period, Pittsfield participants compromised upon a 15-year amortization schedule.

Portsmouth, however, agreed upon a 10-year amortization schedule, a period that many consider too burdensome for such a complex and expensive municipal project. It remains to be seen whether or not the 10-year amortization period that remains in the renegotiated financial structure of the Portsmouth project will prove to be a detriment to the facility's financial success.

Overall, the adjudged usefulness of the Pittsfield project's risk management structure, as opposed to the inconsistencies of the Portsmouth planning effort, is further supported by Portsmouth's recent restructuring of its financing/operating structure. Many of the risk management factors successfully implemented by Pittsfield were adopted in the new Portsmouth package, including the following:

1. Re-financing of the Pease project was carried out through the New Hampshire Industrial Development Financing Authority. Authorization of industrial revenue bonding through this state agency results in a reduction of the risk burden associated with the city-raised general obligation bonds that Portsmouth originally relied upon for project financing.

2. Renegotiation of the Pease project resulted in a spreading-out of risk responsibility among participants, mainly by removing city-ownership of the facility, thereby maintaining the City's role as that of day-to-day user, only.

3. The revenue-raising capacity of the project was improved, by raising the tipping fee to a realistic level

($12.00 per ton), and requiring the steam purchaser to agree on default payments to the project if the yearly energy floor agreement is not adhered to.[44]

It is important to note that the differences between the Pittsfield project's high success rate and Portsmouth's initial problems is not a result of "good" or "bad" planning, per se. Rather, many factors unique to each project influenced the local planning process to a great degree. In Pittsfield, the 1950's incinerator project was an often-remembered experience that greatly influenced the direction that project planning was to take. Memories of this project's financial and operational failure resulted in heavy emphasis upon a "fair deal" for all involved in the waste disposal process. The result was a resource recovery system with a high degree of risk management, fostering project success.

Fear of repeated failure also motivated Pittsfield planners to develop alternative sources of project financing. Taking advantage of 1982 federal tax law changes which offered substantial tax credits for these types of projects, Pittsfield was able to induce a high degree of private investment, again increasing the financial safety factor.[45]

It is perhaps unfortunate that the City of Portsmouth did not experience an earlier failure of a municipal waste disposal system, as did Pittsfield in the 1950's. The old adage "once burned, twice shy of fire" might have applied to the initial financial/operating structure devised by Pease project planners. As earlier experience with waste process-

ing was not a factor in the Portsmouth case, the City did not have total comprehension of the risks involved with public resource recovery. As such, initial project results were markedly different from those in the Pittsfield case.

Such reasoning can be seen in the difference between both cities' criteria in selecting plant operators. Pittsfield chose Vicon to operate its plant on the basis of the company's strong financial assets and lower service costs to the City.[46] Portsmouth, however, chose Consumat as plant operator, based upon the company's experience in operating resource recovery plants in other communities.[47] Yet at the time when both projects were being planned, no true, transferable "state-of-the-art" had emerged in the technological sense for the planning of resource recovery facilities. As such, both communities were much better off in emphasizing risk management concerns over technological experience, as Pittsfield planners realized from the start and Portsmouth participants learned well-into the resource recovery process.

Overall, as Aldrich and Rofe write, an understanding of the risk management issue as structured in Pittsfield (and eventually adopted in Portsmouth) marks a major milestone in small-scale municipal resource recovery history.[48] The analysis above demonstrates that small municipalities can successfully plan for both the financing and operating of such municipal service projects, by developing a systems structure that places risk management as a top priority in

the resource recovery process.

CHAPTER 4-THE SITING ISSUE IN RESOURCE RECOVERY

In addition to the interrelated issues of financial risk management and project operating structure, a third key issue which must be resolved in order for successful resource recovery planning to occur is the acceptance of a proposed plant site by concerned members of the host community. Often, acceptance of such a site is routine. In Pittsfield, the plant facility was located on land zoned commercial/industrial and owned by the steam purchaser, while the Portsmouth plant was located directly on U.S. Air Force property. Neither site was situated within proximity of residential property. As such, no substantial level of citizen concern was generated regarding the location of either plant site.

Contrasting the Pittsfield and Portsmouth cases are many resource recovery projects which experience great difficulty in gaining local political acceptance of facility siting proposals. As Larry Susskind writes, industrial development and technological innovation are often prejudged by some as a threat to the "ecological balance" of a community. The problem is further exacerbated when proposed resource recovery projects are located in proximity to residential enclaves.[49]

This chapter examines the issue of facility site selection through a focus upon the citizen participation component of resource recovery planning. Examination of the following

two cases, proposed resource recovery projects in Syracuse, New York, and Worcester, Massachusetts, reveals that it is within the issue area of site selection that organized citizen participation has the greatest impact upon the resource recovery decision-making process. As will be seen below, citizen participation in this early stage of the resource recovery process can have great influence upon the direction that planning takes. The following cases illustrate that consistent, organized input on behalf of local citizens groups can have immense consequences, possibly resulting in postponement or abandonment of the proposed project.

Syracuse, New York-The Planning Of A "Non-decision"

The political controversy surrounding a proposed resource recovery plant is examined in an empirical study by Bozeman and Bozeman in the Journal of Public Policy (1981).[50] The case study focuses upon a proposed waste-to-energy plant for metropolitan Syracuse, New York, pop. 170,000 (see Appendix, figure 3).

In 1969, the Onondaga County Legislature, in its role as the legislative body of metropolitan Syracuse, commissioned the Solid Waste Disposal Authority to develop a feasibility report on alternatives to the increasingly unsatisfactory landfill method of waste disposal. The Authority's report later that year recommended implementation of the waste-to-energy option for waste disposal. Over the next ten years, the Legislature would authorize over a dozen consulting studies of the problem, while reviewing six technological

approaches, six potential sites, and three major financing schemes. By 1979 no decision had been reached, the result being that the County continued to employ the same method of landfill as relied upon in 1969.[51]

The ten-year resource recovery planning effort in Syracuse may be separated into two distinct phases. Phase One (1969-1976) of the process was characterized by organizational disarray and technological difficulties. Onondaga County, in conjunction with the Central New York Regional Planning and Development Board, spent massive amounts of time, effort, and money in authorizing a series of feasibility studies regarding resource recovery for the Syracuse region. The result of this effort was a massive "overkill" of information, often in the form of conflicting advice regarding various resource recovery options. In addition to this organizational problem, the "state-of-the-art" in resource recovery was such that continual problems developed in structuring facility technology conducive to Syracuse's particular, localized needs.[52]

Phase One of the planning process ended in 1976, with the County Legislature finally accepting the findings of a full-scale design study completed by the Carrier Corporation. The study recommended a refuse-derived fuel (RDF) process at a specific site-McBride Street, an inner-city, low-income and predominantly black neighborhood in the City of Syracuse.[53]

Phase Two of the Syracuse planning process began in

March of 1977, as neighborhood opposition to the McBride Street site proposal began to crystallize. Opposition to the project mounted throughout the year. As a result, in January of 1978, the County appointed a Solid Waste Management Team to contract with various consultants for an additional study profiling the social, economic, and environmental ramifications of an inner-city resource recovery plant.

At the same time, the City of Syracuse, which up to this point had closely monitored developments but had taken no official part in planning, had become mobilized by increasing opposition of local residents. A consensus began to emerge that the proposed resource recovery technology was strictly at the experimental stage and involved substantial social and ecological risk. As such, in September, 1978, the Common Council of the City of Syracuse passed a resolution expressing opposition to the McBride Street site or any other residential location in the city.[54]

By early 1979, the resource recovery issue had emerged at the forefront of Onondaga County politics, with the County Legislature becoming overwhelmed by solicited and unsolicited recommendations for particular technologies at particular sites. The Legislature responded by authorizing yet another study, this time by the private consulting firm of O'Brien and Gere. In its report to the County Legislature in March, 1979, O'Brien and Gere recognized the opposition to the McBride Street site, but noted that their findings regarding the site's feasibility might be evaluated by the opposition (citizens group) and result in a more favorable view of the

location.[55]

At about the same time, a neighborhood impact analysis was prepared by a group of consulting architects commissioned to work with the McBride Street Citizens Neighborhood Advisory Committee. This appears to have been the first attempt to formally include the residents of the affected area in the resource recovery decision-making process. The architects' report looked favorably upon the McBride Street site, indicating that major economic and commercial development might accompany the building of the plant.

However, the Citizens Committee recommended that the plant not be built at the site. Committee members had visited resource recovery facilities around the nation, observing several cases of pollution, traffic, and odor problems. After a series of public meetings, the Committee came to the conclusion that possible economic benefits would be outweighed by environmental and social costs.[56]

The work of the Citizens Committee received more media attention than any previous studies, and the County Legislature immediately moved to establish a Joint City-County Solid Waste Committee to review the O'Brien-Gere report, the architects' report, and the Citizens Committee recommendations. By late-Fall of 1979, after further consultation with the New York Urban Development Corporation, the County Legislature ruled out further consideration of an inner-city site for the resource recovery project. Consideration of an alternative site was put on hold in November, as

elections swept the pro-resource recovery Democratic majority out of the County Legislature. After more than a dozen analyses over a ten-year period at a cost of $2 million, Onondaga County not only did not have a resource recovery plant, but still had not achieved consensus regarding site location of the proposed project.

Worcester, Massachusetts

Waste disposal problems in the Central Massachusetts city of Worcester (pop. 166,000) began in the mid-1960's, when the Commonwealth of Massachusetts closed the environmentally-unsound waste incinerator. For several years thereafter, the City relied upon a landfill within city limits for solid waste disposal. However, by 1977 planners determined that the City had ten years to study options and review proposals before landfill became a nonfeasible disposal option. The problem was primarily due to a growing shortage of land available for landfill, increasing land costs, and a somewhat unsatisfactory management of the existing landfill.[57]

Over the next year, the City began to consider several proposals to deal with its solid waste disposal problem, including resource recovery, bio-conversion, and pyrolisis. In the summer of 1978, the city manager established an Ad Hoc Review Committee of city planners and public works officials to explore the feasibility of structuring a regional approach to solid waste disposal.

The Ad Hoc Committee determined that a regional waste

disposal process would guarantee federal aid for research and planning. Funds would be available through the EPA's Region I Urban Grant program for feasibility studies for resource recovery waste disposal. Additional funding could be secured through the Massachusetts Department of Environmental Quality Engineering (DEQE). These ad hoc recommendations were a crucial turning point in the City's quest for a modern waste disposal system. In January of 1979, the Worcester City Council adopted by an 8-1 vote the Ad Hoc recommendation that the City join with the Central Massachusetts Solid Waste Committee in locating a regional resource recovery plant within Worcester.[58]

The Central Mass. Solid Waste Committee, made up of representatives from 30 communities in Central Massachusetts, established a five-member Resource Recovery Project Group to pursue the planning and implementation of the facility. It quickly came to the attention of the Group that the Norton Company, an international manufacturer of abrasives, was being required by federal legislation (the Power Plant and Industrial Fuel Act) to convert from oil and natural gas use to alternative fuel sources. The Norton Company's most viable option for its plant in the Greendale (northern) section of Worcester appeared to be conversion to coal.

As the proposed resource recovery plant would require a local user of waste-generated steam, the Project Group contacted the Norton Company as to the possibility of developing a plant on Norton Company property in Greendale.

Steam could be produced adjacent to the Greendale site to satisfy the company's power requirements. Any excess steam produced by the project would be used to generate electricity, which would then be sold to the Massachusetts Electric Company.[59]

Norton Company agreed in principal to negotiate a steam contract with the eventual plant operator, sometime after completion of the RFP process. Concerning a plant site, the company and the Resource Recovery Project Group agreed upon a parcel of undeveloped industrial land owned by Norton Company and located in a general manufacturing zoning district (MG-1.0). The site is immediately surrounded on three sides by industrial property and on the fourth side by a public athletic field. The nearest residential areas are 1/4 to 1/2 mile from the project site. However, the site is visible from portions of the surrounding residential neighborhoods of Indian Hill and Greendale.[60]

In March of 1979, the Project Group hired the engineering consultant Mitre Corporation of Boston to carry out a site feasibility study. Mitre determined that the site was suitable for one of two alternative waste-to-energy processes-either a Mass Fired or a Refuse Derived Fuel (RDF) process. The Corporation also recommended building a regional facility capable of receiving an average of 750 tons per day of solid waste. It was estimated that up to 80% (600 tons) of this daily tonnage requirement could be generated by Worcester, with the remaining 150 tons supplied by other member communities of the Solid Waste Committee.[61]

Although the 30 communities that belonged to the Solid Waste Committee generated far more than 150 tons of daily solid waste, only Worcester and five or six nearby towns were anticipated to supply refuse to the facility. This was mainly due to the higher transportation costs for those communities located furthest from the plant.[62]

The Citizens For The Future Of Greendale

As planning of the Greendale project began to intensify, area residents in northern Worcester became wary of the proposed nearby project. In July of 1979, several Greendale neighborhood residents formed a group opposing the project, called the Citizens For The Future Of Greendale. Several of the group's founders had gained organizational experience from participation in an earlier neighborhood group that had unsuccessfully opposed construction of Interstate Highway 190 in northern Worcester, during the early-1970's. Although this earlier failure may have proved disheartening to local residents, public participation in the site selection process would soon provide the citizen's group with a significant role in the resource recovery decision-making process.

As mentioned above, planning for waste disposal on a regional scale made the Greendale project eligible for federal and state funding. In early 1980, the Project Group was allotted a total of $285,500 in EPA and Massachusetts DEQE money to support the project. Use of this funding was

conditional upon establishment of a public participation program component, as required by the Massachusetts Department of Environmental Management (DEM).[63] In compliance with this stipulation, the Project Group hired the Central Massachusetts Regional Planning Commission (CMRPC) to oversee the citizen responsiveness aspect of the project.

On February 4, 1980, a contract was signed between CMRPC and the Mass. DEM, stating that CMRPC would establish an educational program to inform the general public, interested organizations, and affected individuals of the resource recovery planning process and the issues associated with the proposed project. CMRPC also agreed to prepare responsiveness summaries of the public participation program for the Mass. DEM.[64]

Citizen participation in the planning process began in March and April, when CMRPC held two monthly meetings in northern Worcester. Over 3000 notices were sent to area residents. Approximately 235 persons attended each meeting, with four major neighborhood concerns being expressed about the proposed project-traffic impact, air quality impact (especially from possible toxic gases), noise impact, and aesthetic impact. Generally, area residents attending the meetings were opposed to the proposed facility.[65]

The Planning Process Begins To Break Down

In late Spring of 1980, it became apparent that a series of feasibility studies being conducted by Mitre Corporation regarding the project's particular RDF technology needs would

take longer to complete than had been anticipated. As such, Mass. DEM requested that CMRPC slow down the public participation program, so as to allow a concentrated effort at a later date, which would coincide with the issuance of the Request For Proposals (RFP). The result of this request was that the release of technical information to be considered by the public ground to a halt.[66]

As a result of this decision, questions that the public were asking about the plant remained unanswered, due to a lack of available solid information. As such, the Citizens For The Future Of Greendale gained momentum among area residents. Due to the prevalence of news at the time about uncontrolled hazardous waste, the proposed project was represented by the Citizens Group as emitting hazardous industrial chemicals. Although CMRPC countered this argument by explaining that EPA guidelines would prevent such an occurance from happening, the agency could not produce any solid technological information disproving the citizens group's claim, due to the information flow cut-off.[67]

Opposition mounted throughout late-September and October, with local residents increasingly attending weekly Resource Recovery Project Group meetings to voice their opposition to the project. This pressure culminated in a public meeting in north Worcester on October 20, 1980, organized by the Citizens For The Future Of Greendale. Over 300 Greendale-area residents attended, along with a number of project planners and area politicians.

At the meeting, Project Group Chairman Edward Lombardi's explanation of the project's features was firmly and vocally countered by local resident statements against developing the plant in the neighborhood under any circumstances. Residents invoked pictures of the area becoming another Love Canal-reminiscent of the poisonous-waste disaster in Niagara Falls, New York. As such, the residents demanded that the planning process be immediately stopped.

Several elected officials present at the meeting spoke, and agreed to oppose the project on the grounds that it would be environmentally unsafe and detrimental to the neighborhood. Those officials present who supported this view included a state senator, two state representatives, the mayor of Worcester, and five city councilors.[68] It is important to note that several of the councilors were newly-elected to office since the January, 1979 city council vote that had approved the resource recovery planning process by an 8-1 margin.

The final decision regarding the Norton Company site came two weeks later at a weekly meeting of the Worcester City Council. On November 10, 1980, in the presence of over 150 Greendale residents opposed to the project, the city council struck down the proposal to site the plant in Greendale, by an 8-1 vote. As in the Syracuse case, the council passed a resolution declaring that the City would not allow a resource recovery project to be located anywhere within city limits.[69]

Overall, three developments occurred during the resource

recovery planning process that led from the original 8-1 city council approval of the Greendale site to an 8-1 rejection of the location. First, Greendale residents experienced in citizen participation practices organized their neighbors into a vocal opposition group. Secondly, local elections shifted the power balances on the city council, resulting in the election of several new councilors sympathetic to the Greendale residents' concerns. Third, questions raised by area residents concerning both the reliability of resource recovery technology and the plant's local environmental impact could not be answered with solid technical information, due to a virtual halt in the planning information flow, as described above. As a result, after almost two years of planning effort and $100,000 in planning costs, the City of Worcester had failed to come up with a resource recovery plant site viable for the area's pressing solid waste disposal needs.

CHAPTER FIVE-THE ADVERSARIAL PROCESS-ANALYSIS OF PUBLIC PARTICIPATION AND THE PLANT SITING ISSUE

Both the Syracuse and Worcester siting cases are illustrative of the difficulty in resolving public project disputes involving technological innovation. Analysis of these cases, in conjunction with several theoretical studies regarding siting disputes, reveals several reasons as to why "nondecisions" occurred in both the Syracuse and Worcester resource recovery siting processes.

In his analysis of the nature of environmental disputes, Larry Susskind writes that the ability of our political institutions to resolve disputes ensuing from innovative projects has failed to keep pace with the growth in environmentally-based challenges. Although the adversarial nature of our legal system, with its emphasis on winners and losers, strongly discourages contending parties from pursuing consensus, negotiation can often abate the adversarial nature of many developmental conflicts. However, Susskind emphasizes that bargaining is likely to prove fruitless when disputes are narrowed to a yes or no decision, and contending parties have nothing to trade.[70]

From studying several successful cases of out-of-court negotiated mediation, Sussskind develops fundamental steps toward lasting resolution of developmental disputes. One step is particularly relevant to the resource recovery siting issue-differences among the values and assumptions of

contending parties should be discussed and narrowed down to fit a workable agenda. Successful completion of this process depends upon the involvement of a neutral negotiator, who must help to separate value differences from factual disagreements.[71]

Failure to apply this tenet to the site selection process is cited by Bozeman and Bozeman as a major reason for nondecision in the Syracuse project. The authors contend that although information can clarify value issues, consensus is not achieved through shared information, but through shared values.[72]

In the McBride Street site controversy, the parties to the dispute held differing value priorities. The chief concern of the Syracuse City and County Legislatures was to meet the area's waste disposal needs in the most efficient manner possible, while the County Executive was most concerned with making available a cheap energy source to major institutional customers.[73] Both groups placed a high value upon the proposed project's technological efficiency. On the other hand, the McBride Street neighborhood group placed a high value upon the socio-environmental quality of the area within which the project was proposed to be located.

As Bozeman and Bozeman write, there was a visible absence of effort on the part of any party to differentiate between the actual facts of the project and the values held by opposing parties.[74] No neutral mediating unit of government came forth to facilitate mutual understanding and positive compromise of both side's opposing value stances. As such,

the objective content of the Syracuse project's technical information was continually filtered by each party's particular mix of value priorities. Facts were distorted to support embraceable values, resulting in continual project stalemate.

A similar situation hindered the decision-making process in the Worcester siting controversy. As in Syracuse, opposing parties distorted objective facts and technical information in order to support sharply differing value stances regarding the siting of the resource recovery plant. Both the City and the Central Massachusetts Solid Waste Committee emphasized facts regarding the technological efficiency of the proposed plant, in support of the high value that both parties placed upon technological innovation.

Countering this view were the fears of local residents who placed a high value upon the socio-environmental status of their neighborhood. The local residents filtered the objective information regarding the project's technological efficiency to support their own viewpoint. As such, the same objective information regarding the proposed plant's technology and waste disposal efficiency was mixed with each side's value priorities, producing two polarized interpretations of the project's potential impact on the local community.

The Role Of The Neutral Mediator

An understanding of the second factor in Susskind's formula for successful project negotiation, active involve-

ment of a neutral mediator in the plant siting process, is vital to a full comprehension as to why both the Syracuse and Worcester conflicts resulted in nondecisions. According to Susskind, neutral mediation is vital to the ad hoc negotiation process in conflict situations. Active mediation can facilitate positive decision-making by helping to clarify opposing viewpoints, differentiate between fact/value discrepancies, and foster trust among all parties to the conflict.[75]

The neutral mediation component did not even begin to develop in the Syracuse plant location decision-making process. While a myriad of agencies from all levels of government became involved in the plant location process, no one agency came forth to assume a neutral, facilitating role to the conflict. As such, various governmental agencies steadfastly supported the McBride Street site based upon the location's value for technological efficiency, while the McBride Street neighborhood group rejected the site, due to the project's expected effects upon the area's socio-environmental integrity. The gap between these opposing fact/value stances could not be overcome without active facilitation on the part of a neutral mediator. As mediation was not implemented, the various parties to the conflict "muddled through" the site planning process in an uncoordinated, adversarial, and eventually fruitless manner.

Neutral mediation was also lacking in the Worcester site controversy. The events that took place at the Citizens For The Future Of Greendale public meeting on October 27, 1980, are illustrative regarding the need for an active, neutral

mediating agent to bridge the gap between opposing fact/value mixes, and promote positive compromise.

As mentioned in Chapter Four, two opposing fact/value viewpoints were in conflict at the meeting. While project planners embraced values of waste disposal efficiency in support of the project, area residents opposing the plant held strong values reflecting neighborhood social and environmental integrity. At no time during this meeting did any speaker representing either party, or any neutral outside party, come forward on behalf of reaching a mutual compromise between opposing preferences. This situation resulted in one party's viewpoint (the local residents) entirely overwhelming the opposing group (project planners), to the point where no decision could be made at all for siting the much-needed resource recovery project.

The Role Of The Public Participation Coordinator

It is important to note that the CMRPC could possibly have taken a neutral mediation stance toward the project, in its role as coordinating agency for the public participation component of the project. However, the CMRPC's official client in the project was the EPA. Through its contract stipulations with the EPA Urban Grant Program, the CMPRC was required to establish an educational program to inform all concerned parties as to the project's background, schedule of future project events, and basic plant operation. In order to carry out this contractual obligation, the CMRPC scheduled

monthly public participation meetings at which a slide show was presented, focusing upon the project's technological efficiency in meeting regional waste disposal needs. As stated in one of the agency's responsiveness summaries to the EPA, the purpose of the slide show was "to educate and interest the general public about the resource recovery project."[76] CMRPC planners thus embraced the waste disposal efficiency values of the Greendale site proponents, as the agency was obligated to do so according to the EPA contract.

Had the EPA contract not been signed by CMRPC, perhaps the agency could have assumed a more middle-of-the-road stance in the conflict. Instead, CMRPC participation in the siting issue came down firmly on the side of project proponents, in accordance with contract guidelines. Rather than implementing strategies with goals oriented toward producing both fact/value clarification and a compromised site agreement, agency planners countered residents' social and environmental concerns with attempts to educate them regarding the efficiency of resource recovery. Agency planners came to be seen as "the opposing side" to Greendale residents, rather than neutral public participation facilitators. As a result, the gap between plant proponents and opponents remained unbreached, resulting in a nondecision for resource recovery planning in Worcester.

Problems Of Information Management

Perhaps the most important factor influencing the eventual nondecisions in both plant location controversies

was a basic misunderstanding of the role of technical information within the resource recovery planning process. In both cases, all participants in the planning process held the highest regard for "hard," technical data. In Syracuse, a County Legislature lamented, "if only we can get the true facts, we'll be able to get moving and make a decision," while in the Worcester case members of the Greendale residents group emphasized at several public meetings the need for more technical data to understand the proposed project. However, the above participants misunderstood the proper role of technical information within the site location process. As Bozeman and Bozeman write, technical information plays a major role in the siting issue, but that role is the reduction of uncertainty, not the rationalization of value-based decisions, as was too often the case in Syracuse and Worcester.[77]

Both authors agree that the Syracuse case clearly illustrates the fallacy of such reasoning. While many of the crucial issues in resource recovery do revolve around technological considerations, there are rarely clear-cut and rational solutions to readily identifiable problems. As most of the technical information generated in both projects made claims and projections about untested future events, the voluminous collection of technical studies could not precisely answer the questions most salient to the involved parties, regarding both waste disposal efficiency and the plant's socio-environmental effects upon the unique situation at hand.[78]

In addition to misunderstanding the role of technical information in the siting process, both Syracuse and Worcester planners relied upon poor information systems for developing resource recovery data. The uncoordinated information process in Syracuse resulted in an overkill of feasibility reports that presented conflicting conclusions regarding all aspects of the site location process. The initial site information system in Worcester appeared adequate, yet insistence by the EPA that output from the system be temporarily suspended until advent of the RFP process, resulted in a further polarization of opposing parties in the siting controversy.

In both cases, an understanding of the role of technical information and management of the information system was of such poor quality that it exacerbated both the high degree of uncertainty and the political controversies surrounding proposed plant sitings.

In summary, it can be seen from the above analysis that four major factors in the plant siting decision-making process intensified the adversarial nature of the siting process, thus resulting in two nondecisions for potential resource recovery planning. First, participants in the site selection process developed problems in differentiating between facts and values, leading to the misuse of technical information in order to justify held values. Secondly, the presence of a neutral mediator to clarify fact/value

differences, seen by Susskind as a key to facilitating compromised decision-making, was lacking in both cases. Third, all parties to the controversies relied upon the fallacy that "hard" technical data can provide clear-cut and rational solutions to all readily identifiable problems. Acceptance of this fallacy encouraged all parties to rationalize held decisions, while discouraging attempts to reduce differences through fact/value clarification. Finally, poor management of the information systems producing technical information (feasibility studies, etc.) exacerbated existing uncertainties and political controversies surrounding both resource recovery plant siting proposals.

As this analysis indicates, many lessons can be learned from the Syracuse and Worcester nondecisions, regarding the role and impact of citizen participation, technical information, neutral mediation, and fact/value clarification in the resource recovery planning process. An understanding of these dynamics of the site selection process can lead to the establishment of information systems and planning guidelines acceptable to all involved in the resource recovery planning process. However, failure to acknowledge the information, mediation, and fact/value issues inherent in any siting process can lead to project failure, or a "nondecision" at best, as witnessed in the Syracuse and Worcester case examples.

CHAPTER SIX-CONCLUSIONS AND RECOMMENDATIONS

The overall focus of this study has been upon the question of why some resource recovery planning endeavors result in relative success, while other projects fail to implement an adequate waste-to-energy system for a municipality. In carrying out this analysis, it has been essential to limit the study scope to the three issue areas most relevant to the initial planning and start-up phases of the resource recovery process. These three issue areas are: 1) risk management of the project; 2) the operational structure of the facility; and 3) the plant siting process as it unfolds within each particular case situation. Throughout this study, analysis of the three issue areas has been qualified by the understanding that political, socio-economic, and environmental elements greatly differ among all municipalities. As such, this study's conclusions are not meant to serve as definitive conclusions of resource recovery in the Northeast. Rather, the four cases examined should be considered as representative of unique recovery situations that can be referred to when planning future resource recovery plants.

As planners for the Pease Air Force Base project in Portsmouth, New Hampshire emphasize, it is important to stay within the parameters of these three issue areas when examining the resource recovery planning process. Any study can quickly become overburdened and unfocused in attempting

to include the engineering or purely political issues which abound within each proposed project.[79] By staying within the boundaries of the three issue areas examined in Chapters Two through Five, an understanding can be derived regarding the nature of resource recovery planning, and the role of various fiscal and public participation methods, guidelines, and philosophies in fostering project success, or hastening project failure.

Risk Management And Operating Structure- An Interrelationship Of Issue Areas

Analysis of the preceding case studies reveals a strong relationship between the structuring of risk management systems and the development of operating structures for resource recovery projects. An example of this relationship can be seen in the analysis in Chapter Three regarding the most advantageous ownership/operating structure for resource recovery facilities. Examination of the Pittsfield and Portsmouth projects revealed that in order to minimize municipal financial risk, a facility should be privately owned and operated, rather than city-owned. As such, a successful risk management strategy dictates the nature of a project's operating structure.

Overall, the following conclusions are based upon the preceding analysis of the Pittsfield, Mass. and Portsmouth, New Hampshire projects:

A. Plant Ownership

The operating structures of resource recovery facilities

are most successful when plants are privately-owned and operated. Both the Pittsfield and Portsmouth case studies support the conclusion that plant ownership represents too heavy a fiscal burden for today's cities and towns to bear. Municipalities prosper best in the resource recovery process when taking the role of waste disposal customer only, allowing a private resource recovery firm to carry the burden of plant ownership and operation.

B. After-Cost Revenue Apportionment

Apportionment of revenue accruing after amortization payments and operating expenses should be made on a "fair-deal" basis, as was the policy in the Pittsfield project. Equal revenue portions should be provided to plant owners, operators, and city/town facility users. Adoption of this policy reduces fiscal risk in two ways-by minimizing dissatisfaction among revenue share partners concerning revenue share sizes, and by providing for a constant, adequate revenue flow to all fiscal parties, thus enhancing the fiscal attractiveness of resource recovery as a waste disposal alternative.

C. Tipping Contracts

As tipping contracts provide a major source of project revenue, the setting of proper waste disposal rates is vital to the fiscal health of any resource recovery project. Tipping fees must reflect realistic revenue needs, in order to cover amortization payments and operating expenses, while having enough after-cost revenue to divide among "fair deal"

participants. Project planners run considerable financial risk by reducing tipping contract rates in order to attract potential waste disposal customers, as was initially the case at the Pease Air Force Base plant in Portsmouth, New Hampshire.

D. Project Bonding

Project risk is further reduced by financing plant construction through the issuance of industrial revenue bonds, backed by a state or local industrial development revenue commission. Both the Pittsfield and Portsmouth experiences support the conclusion that industrial development bonds prove less burdensome to a project, by attracting a considerably lower amortization payment interest rate than city-backed general obligation bonds.

E. The Amortization Repayment Period

As resource recovery projects represent highly complex and expensive municipal endeavors, a repayment period of fifteen years is generally considered as acceptable to the fiscal constraints of a project. While a shorter or longer repayment period may prove acceptable to some project situations, given particular local fiscal considerations, the financial risk of carrying a shorter repayment schedule can be seen in the Portsmouth case, while a longer period is considered unfeasible by the at-large private financial community.

F. Energy-Purchase Guarantees

Energy-purchase clauses within steam or electricity-purchase contracts can prevent any revenue shortfalls from

accruing and increasing fiscal risk to a project. The importance of energy-purchase stipulations can be seen in the year-one shortfall in steam purchases by Pease Air Force Base from the Portsmouth resource recovery facility. The air base failed to purchase 20,000 MBTU's of the 236,000 MBTU's of refuse-derived steam projected to be needed by the base, thereby adding to the project's revenue shortfall and further hastening financial crisis. As such, guarantees by the energy-purchaser that proper repayments will be made, in lieu of agreed-upon energy puchase levels, would greatly enhance the financial security of any resource recovery project.

Public Participation And The Plant Siting Issue

The third main issue area examined in this study has been the role of citizen participation in the plant siting issue. Examples of the effects of a strong public participation component upon the plant siting decision can be seen in the Syracuse, New York and Worcester, Massachusetts siting cases. Both processes resulted in "nondecisions," or breakdowns in the planning process due to failure by both communities to find an acceptable site for their respective plants.

Four basic factors were identified as lacking in the Syracuse and Worcester plant location processes. Analysis of both cases supports the conclusion that failure to account for these factors intensified the adversarial relationship between the public, as represented by the residents living

near the proposed plant sites, and project planners. The following four key factors should be integrated into the plant siting process, in order to prevent nondecisions from diminishing a community's options for successful resource recovery:

A. The clarification of facts and values-participants in the site selection process (citizens, planners, and politicians) must consciously differentiate between project facts and personally-held values regarding resource recovery. Failure to do so will lead to the bipolarization of planning participants into "for" and "against" camps, thus increasing the chances for a nondecision to occur.

B. The importance of a neutral mediator-the presence of a neutral mediator or mediating body is essential to develop the trust needed between all parties for clarifying fact/value differences and facilitating compromised decision-making.

C. The fallacy of technical data-it is important for plant siting participants to understand and consciously avoid embracing the fallacy of technical data-namely, the belief that generation of enough technical data, or "hard" facts, can provide clear-cut and rational solutions to all readily identifiable problems in siting a resource recovery plant. Acceptance of this fallacy encourages all parties to rationalize held decisions, while discouraging attempts to reduce conflict through fact/value clarification.

D. Proper management of the resource recovery information system-both the proper management of the information

system and dissemination of that system's information to all parties involved in the siting process-is extremely vital to maintaining the flow of the resource recovery planning process. Development of a responsive information system can help to dissolve existing uncertainties and political controversies surrounding both plant siting proposals and resource recovery in general.

One Final Recommendation-A Qualification Of This Study's Findings

Hopefully, this study has provided insight into the basic processes of planning for municipal resource recovery facilities, especially given the nature of municipal realities in the Northeastern United States. A final qualification must be added to the descriptions and analyses given above-namely, the understanding that each resource recovery situation is unique in and of itself, regardless of the activities accruing in other resource recovery cases. As such, the situations portrayed in the above four cases should not be considered as definitive of resource recovery in general. Political, socio-economic, and environmental elements greatly differ among all municipalities. These elements will have a great impact upon any attempts to implement the positive resource recovery strategies adhered to above, or to avoid the negative strategies of the projects examined. The results of strategy implementation will always differ between specific waste disposal efforts. As such, a basic tailoring of this study's findings to the particular

waste disposal situation in each community, combined with a clear perception of each locality's particular political, socio-economic, and environmental realities, will hopefully aid in meeting future municipal waste disposal needs.

Footnotes

1. Interview with Mary Ellen Blunt, Planner, Central Massachusetts Regional Planning Commission, Feb. 9, 1984 and interviews with Malcolm J. Chase, P.E., and Craig Musselman, P.E., Kimball-Chase Co.,Inc., Portsmouth, N.H., Jan. 4, 1984.

2. "Report On Semiannual Survey:Resource Recovery Activities," City Currents, March/April 1983, p.1.

3. Ibid, p.1.

4. Barry Bozeman and J. Lisle Bozeman, "Technical Information And Policy Choice:The Case Of The Resource Recovery Nondecision," Journal Of Public Policy 1, May, 1981, pp.251-267.

5. Llewellyn E. Clark, "Case Study Of A 240 Ton/Day Refuse To Energy Project: Vicon, Crane and Co., Pittsfield, Mass." Reprinted from the National Waste Processing Conference, The American Society Of Mechanical Engineers, 1982.

6. Ibid, p.1.

7. Clark, p.2.

8. Ibid, p.2.

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10. Clark, p.3.

11. Clark, p.2.

12. Clark, p.3.

13. Ibid, p.3.

14. Clark, p.4.

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16. Ibid, p.4.

17. Ibid, p.4.

18. Ibid, p.4.

19. Joseph J. Domas,"Pittsfield Is Recovery Success Example," Solid Wastes Management, April 1982, pp.26-27.

20. "Summary Of Operations-Jan. 1-Dec. 31, 1982, Pittsfield, Mass."Vicon Recovery Associates, Pittsfield, Mass., 1983, p.1.

21. Ibid, p.1.

22. "The Portsmouth Resource Recovery Facility," City of Portsmouth, N.H., 1983, p.1.

23. Ibid, p.1.

24. Portsmouth Resource Recovery Facility, p.2.

25. Ibid, p.2.

26. Portsmouth Resource Recovery Facility, p.3.

27. Portsmouth Resource Recovery Facility, p.4.

28. Portsmouth Resource Recovery Facility, p.2.

29. Portsmouth Resource Recovery Facility, pp.2-3.

30. The Defense Stock Fund is budgeted by the U.S. Dept. of Defense for the bulk purchase of departmental oil and gas needs. Contracts are awarded annually under a bid process.

31. Portsmouth Resource Recovery Facility, p.3.

32. "Agreement For Use Of Portsmouth Solid Waste Energy Recovery Facility-Between City Of Portsmouth, N.H. and Town Of Eliot, Maine," Portsmouth, N.H., May 20, 1981.

33. Portsmouth Resource Recovery Facility, p.5.

34 Portsmouth Resource Recovery Facility, Supplemental Page.

35. Portsmouth Resource Recovery Facility, p.6.

36. Ibid, p.6.

37. Ibid, p.6.

38. Ibid, p.6.

39. Musselman Interview, Jan. 14, 1984.

40. Ibid, Jan. 14, 1984.

41. Musselman Interview, Jan. 14, 1984, and Robert H. Aldrich and Rene Rofe, "Small Resource Recovery Project Gets Disposal Revenue Bond Financing," Solid Wastes

Management, January 1980, pp. 15-19.

42. Domas, p.27.

43. Aldrich and Rofe, p.4.

44. Musselman Interview, January 14, 1984.

45. Domas, p.27.

46. Clark, p.3.

47. Portsmouth Resource Recovery Facility, p.2.

48. Aldrich and Rofe, p.4.

49. Larry Susskind, "How To Resolve Environmental Disputes Out Of Court," Technology Review, January 1982, p.39.

50. Bozeman and Bozeman, pp.251-267.

51. Bozeman and Bozeman, p.251.

52. Bozeman and Bozeman, p.252.

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60. What Is Resource Recovery? (Brochure)-Central Massachusetts Regional Planning Commission, Worcester, Mass.: 1980.

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71. Susskind, p.46.

72. Bozeman and Bozeman, p.263.

73. Ibid, p.263.

74. Ibid, p.263.

75. Susskind, p.47.

76. "Responsiveness Summary Of The Central Mass. Regional Resource Recovery Project's Public Participation Program,"Report No.1, April 30, 1980.

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78. Ibid, p.262.

79. Musselman/Chase Interviews, Jan. 14, 1984.

Appendix

Figure 1
Project Chronology
Pittsfield/Vicon Resource Recovery
Planning Process
(1974-1982)

1974 . Solid Waste Commission formed to study waste disposal option.

1976 . Commission recommends resource recovery as a disposal method.

. Market analysis of General Electric Co. and Crane & Co. as potential energy customers.

. Metcalf & Eddy hired to develop feasibility study.

1977 . Crane & Co. signs letter of intent to negotiate steam sales agreement with Vicon.

. April/May-Industrial Development Finance Authority (IDFA) appointed to issue tax exempt bonds.

. June-Three RFP's submitted.

. August-Vicon Associates' RFP selected.

1979 . Feb.-Vicon and City sign disposal contract.

. Feb.-Vicon and City sign steam sales agreement.

. Sept.-$6.2 million industrial revenue bond issue sold.

. Oct.-Plant construction begun.

1981 . Feb.-First plant incinerator fired.

. March-Steam generation process goes on-line.

Figure 2
Project Chronology
Portsmouth/Consumat Resource Recovery
Planning Process
(1977-1984)

1977	.	City of Portsmouth's waste disposal needs become acute.
1978	.	Coolly Co. hires Wright-Pierce Engineering Co. for feasibility study.
	.	Coolly Co. abandons project, City undertakes it.
	.	Resource Recovery Committee appointed by City.
1979	.	March/May-RFP's issued.
	.	Nov.-Two RFP's submitted.
1980	.	Nov.-Consumat RFP selected.
	.	Dec.-Initial City/U.S. Air Force steam sales agreement negotiated.
1981	.	March-Final steam sales agreement signed.
	.	March/May-11 service disposal contracts signed.
1982	.	Feb.-$6.5 million general obligation bond issue sold.
	.	July-Steam generation process goes on-line.
1983	.	July-$800,000--$1,000,000 debt trend forecast.
	.	Oct.- City solicits consultant input regarding debt trend.
	.	Dec.-City/Consumat plant sale negotiations begun.
1984	.	Feb.-Consumat/U.S. Air Force steam sales agreement signed.
	.	Spring-City/Consumat plant ownership contract signed.

Figure 3
Project Chronology
Syracuse, New York Plant Siting Process
(1969-1979)

Phase One

1969	.	County Solid Waste Commission recommends resource recovery option.
1969-1979	.	12 consulting studies reviewed by County for siting options.

Phase Two

1976	.	Carrier Corporation study recommends McBride Street site for plant location.
1977	.	March-McBride Street Citizens Committee formed.
1978	.	Jan.-County Solid Waste Team undertakes feasibility study of McBride Street site.
	.	Sept.-Syracuse City Council passes resolution opposing McBride Street site.
1979	.	O'Brien-Gere study recommends McBride Street site.
	.	March/May-McBride Street Citizens Committee opposes the O'Brien-Gere study.
	.	Oct.-Onondaga County Legislature rules out further consideration of McBride Street site.

Figure 4
Project Chronology
Worcester, Mass. Plant Siting Process
(1977-1980)

1977 . City of Worcester begins to study waste disposal options.

1978 . Summer-City Ad Hoc Review Committee recommends resource recovery option.

1979 . Jan.-City Council votes 8-1 in favor of a city plant site.

. March-Mitre Corporation study recommends Greendale site.

. July-Greendale Citizens Group formed.

1980 . Feb.-Central Mass. Regional Planning Commission (CMRPC) signs contract as public participation coordinating body for the project.

. May-CMRPC halts information program per Mass. Dept. of Environmental Management (DEM) request.

. Oct.-Over 300 local residents attend Greendale Citizens Group meeting.

. Nov.-City Council votes 8-1 against any plant site within city limits.

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