

RESOURCE RECOVERY AND



CONSERVATION ACTIVITIES

Mention of commercial products does not constitute endorsement by the U.S. Government.

A Nationwide Survey

SW142

Waste Reduction and Resource Recovery Activities

This publication (SW-142) was written for the Federal solid waste management programs by Laurence B. McEwen, Jr., and replaces EPA's January 1975 report on this subject.

U. S. Environmental Protection Agency/1977

CONTENTS

	PAGE
Introduction	1
Summary of Resource Recovery Mixed-Waste Facilities Implementation	2
Communities That Have Commissioned Feasibility Studies of Resource Recovery Mixed-Waste Facilities Implementation	4
Summary of State Involvement in Resource Recovery	5
Abbreviations Used	6
Waste Reduction Activities	
Introduction	7
Minnesota	7
Oregon	8
South Dakota	8
Vermont	9
Resource Recovery Activities	
Source Separation Systems	10
Marblehead, Massachusetts	10
Nottingham, New Hampshire	11
Somerville, Massachusetts	12
Separate Collection Locations	14
Resource Recovery Activity Reports—Communities	
Akron, Ohio	17
Albany, New York	17
Altoona, Pennsylvania	18
Ames, Iowa	19
Baltimore County, Maryland	20
Baltimore, Maryland	21
Beverly, Lynn, and Salem, Massachusetts	22
Blytheville, Arkansas	23
Braintree, Massachusetts	23
Bridgeport, Connecticut	24
Central Contra Costa County, California	25
Chemung County, New York	26
Chicago, Illinois (Crawford)	27
Chicago, Illinois (Southwest)	28
Dade County, Florida	28

Detroit, Michigan	29
East Bridgewater, Massachusetts	30
Franklin, Ohio	31
Groveton, New Hampshire	32
Hackensack Meadowlands, New Jersey	33
Harrisburg, Pennsylvania	33
Hempstead, New York	34
Honolulu, Hawaii	35
Lane County, Oregon	36
Lexington-Fayette Urban County Government, Kentucky	37
Memphis, Tennessee	38
Merrick, New York	38
Miami, Florida	39
Milwaukee, Wisconsin	40
Minneapolis-St. Paul, Minnesota	41
Monroe County, New York	41
Montgomery County, Maryland	42
Montgomery County (Dayton), Ohio	43
Mountain View, California	44
Nashville, Tennessee	45
New Haven, Connecticut	46
New Orleans, Louisiana	47
Norfolk, Virginia (U.S. Naval Station)	48
Onondaga County, New York	49
Palmer Township, Pennsylvania	50
Palos Verdes, California	50
Pompano Beach, Florida	51
Portland, Oregon	52
Portsmouth, Virginia (Norfolk Naval Shipyard)	53
Riverside, California	54
St. Louis, Missouri (Demonstration)	54
St. Louis, Missouri (Union Electric Company)	55
San Diego County, California	56
Saugus, Massachusetts	57
Seattle, Washington	58
Siloam Springs, Arkansas	59
Smithtown, New York	60
South Charleston, West Virginia	60
Sun Valley, California	61
Westchester County, New York	62
Wilmington, Delaware	63
 Resource Recovery Activity Reports—State Programs	
California	65
Connecticut	66
Florida	67
Illinois	68

Maryland	68
Massachusetts	69
Michigan	70
Minnesota	70
Montana	71
New York	71
North Carolina	72
Ohio	73
Pennsylvania	73
Rhode Island	74
Tennessee	75
Washington	75
Wisconsin	76
Appendix A. . . .Communities Recovering Only Ferrous Metal, 1975	78

Waste Reduction and Resource Recovery Activities

The following report summarizes resource recovery and waste reduction activity in the United States in the summer of 1976. It is presented to inform communities and those interested of activity in this field and to encourage the exchange of information concerning technology and implementation processes among local and State governments. This publication updates and replaces the January 1975 publication of the same title.

This summary includes reports on a survey of resource recovery technologies of all types in communities of all sizes. Also included in this summary are separate sections reporting local programs involving separate collection of selected materials and State plans directed at waste reduction.

The survey involved a review of published and unpublished literature, telephone and letter contacts, and selected site visits by U.S. Environmental Protection Agency contacts working with individual States or communities as indicated in the report. This report represents a summary of information acquired as of June 1976.

Included in this report are descriptions of the activities of those communities that are operating, constructing, or in advanced stages of planning to implement a resource recovery or waste reduction system. The selection of these criteria and the placement of communities within the criteria is somewhat arbitrary and is intended only to provide a means of classifying the many communities contemplating action regarding a resource recovery system.

Additional information or comments regarding this report should be addressed to the author (AW-463), Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C. 20460.

Summary of Resource Recovery Mixed-Waste Facilities Implementation (Summer 1976)

Location*	Type**	Capacity (TPD)	Products/markets	Startup date
Systems in Operation (19):				
Altoona, Pennsylvania	Compost	200	Humus	1963
Ames, Iowa	RDF	400	RDF, Fe, Al	9/75
Blytheville, Arkansas	MCU	50	Steam/process	11/75
Braintree, Massachusetts	WWC	240	Steam/process	1971
Chicago, Illinois (Southwest)	RWI	1,200	Steam/industrial park	1963
N.E. Bridgewater, Massachusetts	RDF	160	RDF/utility	1974
D-Franklin, Ohio	Wet pulp	150	Fiber, Fe, glass, Al	1971
Groveton, New Hampshire	MCU	30	Steam/process	1975
Harrisburg, Pennsylvania	WWC	720	Steam/sludge drying	1972
Merrick, New York	RWI	600	Electricity	1952
Miami, Florida	RWI	900	Steam	1956
Nashville, Tennessee	WWC	720	Steam heating & cooling	7/74
Norfolk, Virginia	WWC	360	Steam/navy base	1967
Oceanside, New York	RWI/WWC	750	Steam	1965/74
Palos Verdes, California	Methane recovery		Gas utility & Fe	6/75
D-St. Louis, Missouri	RDF	300	RDF coal-fired utility	1972
Saugus, Massachusetts	WWC	1,200	Steam/process	4/76
Siloam Springs, Arkansas	MCU	20	Steam/canning industry	9/75
N-S. Charleston, West Virginia	Pyrolysis	200	Gas, Fe	1974
Systems under construction (10):				
D-Baltimore, Maryland	Pyrolysis	1,000	Steam/utility; Fe, glass	6/75
G-Baltimore County, Maryland	RDF	550	RDF, Fe, Al, glass	4/76
Chicago, Illinois (Crawford)	RDF	1,000	RDF/utility	6/76
Hempstead, New York	Wet process RDF	2,000	Electricity/utility; Fe, Al, glass	NA
Milwaukee, Wisconsin	RDF	1,000	RDF, corrugated, Fe	1977
D-Mountain View, California	Methane recovery		Gas utility	6/77
N-New Orleans, Louisiana	Materials	650	Nonferrous, Fe, glass, paper/secondary materials industries	11/76
Portsmouth, Virginia (Shipyard)	WWC	160	Steam/heating loop	12/76
D-San Diego County, California	Pyrolysis	200	Liquid fuel utility; Fe, Al, glass	4/77
St. Louis, Missouri	RDF	6,000	RDF/utility; Fe, glass, Al	NA

SUMMARY OF RESOURCE RECOVERY MIXED-WASTE FACILITIES IMPLEMENTATION (Summer 1976) - Con.

Location*	Type**	Capacity (TPD)	Products/markets	Startup date
Communities in advanced planning (33):*** RFP issued, design study underway, or construction funding made available.				
Akron, Ohio	WWC	1,000	Steam/heating & cooling, process	7/78
Albany, New York	RDF	1,200	RDF, Fe	NA
Beverly, Salem, & Lynn, Massachusetts	WWC	500	Steam/industry	NA
Bridgeport, Connecticut	RDF	1,800	RDF, Fe, Al, glass	NA
Central Contra Costa County				
Sanitation District	RDF	1,000	RDF/sludge incinerators	1979
Chemung County, New York	RDF	200	RDF or steam	NA
Dade County, Florida	Wet process RDF	3,000	Electricity/utility; Fe, Al, glass	NA
G-Detroit, Michigan	RDF/WWC	3,000	Steam/utility; Fe	NA
Hackensack Meadowslands, New Jersey	RDF	2,500	Steam/utility	NA
Haverhill, Massachusetts	WWC	3,000	RDF/utility, Fe	NA
Honolulu, Hawaii	NA	2,000	RDF or steam/utility	NA
Jacksonville, Florida (navy base)	MCU	50	Steam, Fe	NA
Key West, Florida (navy base)	Compost	50	Humus, Fe	NA
G-Lane County, Oregon	RDF	750	RDF/industry	NA
G-Lexington-Fayette Urban County Gov't, Kentucky	WWC	1,050	Steam/heating & cooling; Fe	1977
Mayport, Florida (navy base)	RWI	40	Steam	NA
Memphis, Tennessee	WWC/RDF	2,000	Steam/heating & cooling	NA
Minneapolis-St. Paul, Minnesota	WWC	1,200	Steam/paper mill	1980
Monroe County, New York	RDF	2,000	RDF/utility; Fe, Al, glass	NA
G-Montgomery County, Ohio	RDF	1,600	RDF	NA
New Haven, Connecticut	WWC	1,800	Steam, Fe	NA
North Little Rock, Arkansas	MCU	100	Steam/industry	1977
Onondaga County, New York	WWC	1,000	Steam heating & cooling, Fe	NA
E-Pompano Beach, Florida	Methane recovery	50	Methane	NA
D-Palmer Township, Pennsylvania	RDF	150	RDF/cement kiln, Fe	NA
Portland, Oregon	RDF	200	RDF Fe	NA
Riverside, California	Pyrolysis	50	N/A (Prototype/demo)	NA
Seattle, Washington	Pyrolysis	1,500	Ammonia/industry	NA
Smithtown, New York	Materials separation	1,000	Hand sort	11/77
Sun Valley, California	Methane recovery		Gas/utility	1978
Tacoma, Washington	RDF	N/A	Steam	NA
Westchester County, New York	NA	1,300	NA	NA
D-Wilmington, Delaware	RDF/sludge	300	RDF, Fe, Al, glass, humus	NA

*D-EPA demonstration grant; G-EPA implementation grant; N-non-EPA demonstration facility; E-ERDA grant.

**RDF-Refuse-derived fuel; WWC-Waterwall combustion; RWI-Refactory wall incinerator with waste heat boiler; MCU-Modular combustion unit.

***RFP issued, design study underway, or construction funding made available.

Communities (54) That Have Commissioned Feasibility Studies of Resource Recovery Mixed-Waste Facilities Implementation (Summer 1976)

Location*	Capacity (TPD)	Location*	Capacity (TPD)
Anchorage, Alaska	500	Madison, Wisconsin	200
Auburn, Maine	200	Niagara County, New York	760
Allegheny County, Pennsylvania	2,000	G-New York, New York (Arthur Kill)	1,500
Babylon, Hunting, & Islip, New York	3,000	Oakland County, Michigan	NA
Brevard County, Florida	200	Orange County, California	1,000
G-Charlottesville, Virginia	NA	Phoenix, Arizona	NA
Cowlitz County, Washington	100	Pasadena, California	200
Columbus, Ohio	NA	Peninsula Planning District, Virginia	NA
Cuyahoga County, Ohio	1,200	Philadelphia, Pennsylvania	1,600
De Kalb County, Georgia	1,000	G-Richmond, Virginia	NA
Dubuque, Iowa	500	Riverview, Michigan	NA
District of Columbia (Metro Area COG)	750	Rochester, Minnesota	NA
G-Denver, Colorado	1,200	St. Cloud, Minnesota	NA
Dutchess County, New York	700	Salt Lake County, Utah	750
Erie County, New York	2,000	Scranton, Pennsylvania	NA
Fairmont, Minnesota	150	S. E. Virginia Planning District	1,500
Hamilton County, Ohio	1,500	G-Springfield, Illinois	NA
Lawrence, New York	500	Springfield, Missouri	1,000
Lincoln, Nebraska	NA	Tallahassee, Florida	NA
Lincoln County, Oregon	NA	Tampa/St. Petersburg, Florida	NA
Marquette, Michigan	NA	Toledo, Ohio	1,200
Miami County, Ohio	NA	Tulsa, Oklahoma	NA
G-Middlesex County, New Jersey	NA	Tennessee Valley Authority	2,000
Minneapolis (Twin Resco), Minnesota	NA	Western Berks County, Pennsylvania	250
Montgomery County, Maryland	1,200	Western Lake Superior Sanitary District	400
Morristown, New Jersey	NA	Winnebago County, Illinois	NA
Mt. Vernon, New York	400	Wyandotte, Michigan	1,000

*G - EPA implementation grant.

Summary of State Involvement in Resource Recovery (Summer 1976)

States with grant or loan authority (12)	States involved in planning or regulation (20)*	States with operating authority (6)
California	California	Connecticut
Connecticut	Connecticut	Florida
Florida	Florida	Maryland
Illinois	Hawaii	Michigan
Maryland	Illinois	Rhode Island
Massachusetts	G-Maryland	Wisconsin
Minnesota	G-Massachusetts	
New York	Michigan	
Ohio	Minnesota	
Pennsylvania	Montana	
Tennessee	New York	
Washington	North Carolina	
	Ohio	
	Oregon	
	Pennsylvania	
	G-Rhode Island	
	South Dakota	
	Vermont	
	Washington	
	Wisconsin	

*G—EPA implementation grant.

Abbreviations Used

Al	Aluminum
Btu	British thermal unit
CO	Carbon dioxide
DSCF	Dry standard cubic foot
Fe	Ferrous metal
MCF	Million cubic feet
MCU	Modular combustion unit
NA	Not available
OSWMP	Office of Solid Waste Management Programs (EPA)
PSIG	Pounds per square inch gauge
R&D	Research and Development
RDF	Refuse-derived fuel
RFP	Request for Proposals
RWI	Refractory wall incinerator
TPD	Tons per day
TPH	Tons per hour
WWC	Waterwall combustion

Waste Reduction Activities

Waste reduction measures are designed to reduce the amount of solid waste that is generated, thereby reducing collection and disposal costs. When waste reduction incorporates the reuse of products, a decrease in the use of natural resources and in energy consumption results and lower levels of manufacturing residuals are deposited to air, land, and water mediums. Consideration of waste reduction measures should precede but not preclude the implementation of a resource recovery system.

Recently, legislatures and planners have begun to consider waste reduction measures an integral part of their solid waste management programs. Four State and numerous local governments have enacted waste reduction measures. Oregon, Vermont, and South Dakota have passed beverage container legislation, while Minnesota has enacted a comprehensive packaging law. Each of these programs is described in the following section.

While many communities have passed local beverage container laws, few of these laws have been vigorously enforced. Active local waste reduction efforts will be described in future issues of this report.

Comments regarding waste reduction activity should be addressed to Thomas Canfield, Resource Recovery Division (AW-463), U.S. Environmental Protection Agency, Washington, D.C. 20460.

STATE OF MINNESOTA

PROJECT CONTACT: Karen A. Wendt
Minnesota Pollution Control Agency
1935 West County Road, B-2
Roseville, Minnesota 55113
(612) 296-7366

PROJECT TYPE: Packaging legislation

PROJECT STATUS

The Minnesota Legislature passed the Recycling of Solid Waste Act in 1973. This act provided the authority for the Pollution Control Agency (PCA) to make grants for resource recovery projects and to write environmental guidelines for new packages introduced into the Minnesota marketplace.

The PCA developed regulations for packaging review in accordance with the legislation; these regulations were published in final form on December 31, 1974.

In May 1975, an action for declaratory judgment and a request for a restraining injunction was brought against the PCA by a coalition of packaging industry organizations. The plaintiffs sought this action on the basis that the regulations were arbitrary and capricious and the statute was vague. In December the court decided in favor of the statute and the regulations.

For more information, the reader is referred to the following publication: Wendt, K. A. *Damming the Solid Waste Stream: The Beginning of Source Reduction in Minnesota; First Annual Report to the Minnesota Legislature*. Roseville, Minnesota Pollution Control Agency, Jan. 1975. 159 p.

STATE OF OREGON

PROJECT CONTACTS: William Bree
Recycling Information Office
Department of Environmental Quality
1234 S. W. Morrison Street
Portland, Oregon 97205
(503) 229-5119

Donald Waggoner
Oregon Environmental Council
2637 S.W. Water Avenue
Portland, Oregon 97201

PROJECT TYPE: Beverage container legislation

PROJECT STATUS

Oregon's "Bottle Bill" became effective on October 1, 1972. This law requires that all beverage (soft drink and beer) containers sold in the State after that date shall have a refund value of not less than 5 cents. The only exception is for those containers that have been certified reusable by more than one beverage producer. In this instance, a refund of 2 cents is allowed.

The intention of the legislature in passing this law was to give consumers an economic incentive not to litter beverage containers. Instead, consumers have an incentive to return the containers to the retailer, who can return the refillable containers for reuse or process the nonrefillables for recycling.

In order to facilitate the return of beverage containers, the law contains a provision that allows retailers to establish redemption centers. As of this time, however, no redemption centers have been established in Oregon.

The problem of beverage container litter in the form of pull tabs was also addressed, and the State legislature banned the use of detachable closures on cans.

Finally, the law requires that all beverage containers sold in the State clearly indicate the refund value of the container.

For more information, the reader is referred to the following publications: Applied Decision Systems, and Decision Making Information, Inc. *Study of the Effectiveness and Impact of the Oregon Minimum Deposit Law; Project Completion Report*. Salem, State of Oregon Department of Transportation, Highway Division, Oct. 1974. 1 v. (various pagings.)

Claussen, E. *Oregon's Bottle Bill: The First Six Months*. Environmental Protection Publication SW-109. Washington, U.S. Government Printing Office, 1973. 14 p.

Gudger, C. M., and J. C. Bailes. *The Economic Impact of Oregon's "Bottle Bill."* Corvallis, Oregon State University Press, Mar. 1974. 73 p.

Waggoner, D. *Oregon's Bottle Bill Two Years Later*. Portland, Columbia Group Press, May 1974. 37 p., app.

STATE OF SOUTH DAKOTA

PROJECT CONTACT: T. McDermott
Department of Commerce and Consumer Affairs
State Capital
Pierre, South Dakota 57501
(605) 224-3177

PROJECT TYPE: Beverage container legislation

PROJECT STATUS

During the 1974 legislative session, the Governor signed into law a bill aimed at reducing litter. Among the provisions in this law was one requiring that all beverage containers sold in South Dakota after July 1, 1976, shall be in either a reusable or a biodegradable container. The standards for those two terms were to be established by the Secretary of the Department of Commerce and Consumer Affairs for the State of South Dakota.

During the 1976 session, the State legislature amended the 1974 litter law as it relates to beverage containers. This amended law requires that all beverage containers sold in South Dakota after July 1978 shall be sold in biodegradable, reusable, or recyclable containers. As with the previous law, these terms are to be defined by the Secretary of the Department of Commerce and Consumer Affairs.

STATE OF VERMONT

PROJECT CONTACT: Donald Webster
Division of Protection
Agency of Environmental Conservation
5 Court Street
Montpelier, Vermont
(802) 828-3388

PROJECT TYPE: Beverage container legislation

PROJECT STATUS

In April 1972, the Vermont Beverage Container and Trash Removal Fund Act was signed into law. This law contained two basic sections. The first section, which was in effect from July 1, 1972, to July 1, 1973, levied a tax on all beverage containers except returnable containers. The revenues generated by this tax were distributed to local governments for the operation and maintenance of solid waste disposal facilities throughout the State.

The second section went into effect after July 1, 1973. The tax provisions of the Vermont law were replaced by a mandatory 5-cent deposit on all beverage containers. The act also required that beverage containers sold after the effective date be labeled with the name of the State.

During the 1975 legislative session, a new act was signed into law that incorporated the beverage container provisions of the 1972 law and, in addition, contained supplemental provisions. These new provisions required the modification of container labeling in order to simplify and clarify compliance procedures. Also, it established an educational program to inform the citizenry of the law's benefits. Besides these immediate changes, the law also requires that by January 1, 1977, nonrefillable glass beverage containers, metal cans with detachable parts (i.e., pull tabs), and nonbiodegradable connectors (i.e., plastic rings) be eliminated from the Vermont marketplace.

For more information, the reader is referred to the following publications: Loube, M. *Beverage Containers: The Vermont Experience*. Environmental Protection Publication SW-139. [Washington], U.S. Environmental Protection Agency, 1975. 16 p.

Nadworny, M. J. *Some Economic Consequences of the Vermont Beverage Container Deposit Law*. Burlington, University of Vermont, Feb. 1975. 53 p., app.

Resource Recovery Activities

Source Separation Systems

The source separation technique of resource recovery is accomplished by segregating recyclable waste materials (such as paper, glass, and metal containers) from other wastes at the point of generation (the home, office, or other place of business) by the generator. This separation is followed by transportation of the recyclable materials from their point of generation to a secondary materials dealer or directly to a manufacturer. Transportation may be provided by the generator, city collection vehicles, private haulers, scrap dealers, or by voluntary recycling organizations.

Within the last 5 years, many communities have begun source separation systems in order to conserve landfill space, reduce the load on incinerators, and lower overall solid waste management costs. Most of these systems are relatively low in capital costs compared with other recovery methods. Source separation is proving to be an effective approach for reducing municipal waste tonnages and generating materials for recycling.

Many communities have source separation and separate collection programs. To provide examples of these programs, the activities of innovative programs in three communities are described in this report: (1) Marblehead, Massachusetts (suburban); (2) Nottingham, New Hampshire (rural); and (3) Somerville, Massachusetts (urban). The Marblehead and Somerville programs are partially funded by EPA grants, and the Nottingham program is partially funded by a private foundation grant.

Following brief descriptions of these three programs is a list of known source separation and separate collection activities in the United States. Unless otherwise indicated, these communities collect newsprint only. This list was compiled from the best available information in August 1974. Comments or additions regarding this listing should be addressed to:

Penelope Hansen
Resource Recovery Division (AW-463)
Office of Solid Waste Management Programs
U.S. Environmental Protection Agency
Washington, D.C. 20460

MARBLEHEAD, MASSACHUSETTS

Separate Collection

CAPITAL COST: \$40,300

PRODUCTS/MARKET: Paper, all glass and cans/Recor, Inc.

MAJOR EQUIPMENT MANUFACTURER: Rendispos Corporation

CONSULTANT: Resource Planning Associates, Inc.

STARTUP DATE: January 12, 1976

PROJECT CONTACT: Raymond Reed, Director of Public Health
Adams Hall
Marblehead, Massachusetts 01945
(617) 631-0212

Marblehead is a suburban community in the Boston area with a population of 23,000. In June 1975, the town was awarded a 3-year grant of \$78,000 (31 percent of a \$248,000 project) by EPA to implement weekly separate collection of paper, glass, and cans.

The program requires householders to separate recyclables into three categories: (1) paper; (2) glass and cans; and (3) mixed brown and green glass and cans. Those three elements are collected by a compartmentalized vehicle each week. Nonrecyclable mixed waste is collected by conventional packer trucks. The ordinance that mandates this separation level also includes an antiscavenging provision.

An extensive community education effort has been mounted that has resulted in a 30 percent reduction by weight of the residential refuse disposed of by the town during the first 3 months of the program. The sale of all materials is guaranteed by a minimum-price contract. Revenues received are presently in the \$15 to \$25 per ton range. Because no additional labor has been added, program economics appear to be quite favorable.

EPA is receiving periodic reports on the project and will release an interim report in the spring of 1977.

NOTTINGHAM, NEW HAMPSHIRE Source Separation

CAPITAL COST: \$55,000 (1973)

PRODUCTS: Color-sorted glass; newsprint; corrugated paper; mixed paper; ferrous and aluminum cans

STARTUP DATE: January 1974

PROJECT CONTACT: John Howells
Recycling and Conservation, Inc.
Kittery, Maine
1-(207)-439-1755

METHOD OF FINANCING: 50%, foundation grant
50%, town appropriation

As a result of New Hampshire State regulations forbidding open-burning dumps and as an alternative to landfilling, the city of Nottingham, with a population of 1,200, voted to initiate a recycling system to dispose of its solid waste. In order to implement its recycling system, Nottingham took the following steps:

- Markets were found for the various categories of solid waste that would be recovered.

- Glass, metal, and mixed paper would be sold to Recor, Inc., Salem, Massachusetts (a recovered materials dealer).
- Newspapers and corrugated paper would be sold to a company in Exeter, New Hampshire, for use in the manufacture of construction materials.
- A recovery center was built at the site of the former dump.
- An ordinance was passed that required
 - Household solid waste to be separated into four categories: glass, metal, clean paper, and mixed waste
 - Such waste to be delivered to the recovery center and separated into the four categories

Approximately half of the town's total waste flow is being recycled (this figure has been increasing), with the balance incinerated and/or composted. The capital and net operating costs of this program are comparable to those of alternative waste disposal solutions available to the town. The program has obviated the use of land that would have been needed for landfill operation.

The Nottingham program is serving as an innovative prototype for other small communities in northern New England that are being forced to close their open burning dumps and to seek other methods for solid waste handling and disposal.

SOMERVILLE, MASSACHUSETTS

Separate Collection

CAPITAL COST: \$42,400

PRODUCTS/MARKET: Paper; all glass and cans/Recor, Inc.

MAJOR EQUIPMENT MANUFACTURER: Rendispos Corporation

CONSULTANT: Resource Planning Associates, Inc.

STARTUP DATE: December 17, 1975

PROJECT CONTACT: David Reilly
Superintendent of Highways
Framey Road
Somerville, Massachusetts 02144
(617) 625-6600

Somerville is an urban community in the Boston area with a population of 90,000. On June 15, 1975, the town was awarded a 3-year grant of \$122,000 (35 percent of a \$345,000 project) to implement weekly separate collection of paper, glass, and cans.

The program requires householders to separate recyclables into two categories: (1) paper, and (2) all glass and cans. These two elements are simultaneously collected in a compartmentalized vehicle each week. Nonrecyclable mixed waste is collected by conventional packer trucks. The ordinance that mandates this separation level also includes an antiscavenging provision.

An extensive community education effort has been mounted. During the first 3 months of the program, approximately 9 percent of the residential waste stream has been recovered and sold for recycling. The sale of all

materials is guaranteed by a minimum price contract. Revenues recovered are at present in the \$10 to \$20 per ton range.

EPA is receiving periodic reports on the project and will release an interim report in the spring of 1977.

Separate Collection Locations

EPA Region I

Barrington, RI	Beverly, MA
Lincoln, RI	Cambridge, MA
Tiverton, RI—glass	Chelmsford, MA
Dover, NH	Danvers, MA
Bloomfield, CN—newspaper (rack) & glass	Everett, MA
East Hartford, CN	Hamilton, MA
East Lyme, CN—glass	Marblehead, MA—paper, glass, & cans
Greenwich, CN	Newton, MA—paper, glass, & cans
Newington, CN—paper & glass	Peabody, MA
Norwalk, CN	Pittsfield, MA
Stamford, CN	Somerville, MA—paper, glass, & cans
Waterford, CN	Springfield, MA (rack)
Wethersfield, CN	Tewkesbury, MA—paper, glass, & cans
Arlington, MA	Walpole, MA
Andover, MA—newspaper, glass, & cans	Waltham, MA
Bedford, MA—newspaper, glass, & cans	Winthrop, MA

EPA Region II

Avon By The Sea, NJ	Westfield, NJ
Bergenfield, NJ	West Orange, NJ—paper & glass
Bloomfield, NJ	Albany, NY
Clifton, NJ	Baldwin, NY
East Windsor, NJ	Briarcliff Manor, NY
Elizabeth, NJ	Brookhaven, NY
Englewood, NJ	Dobbs Ferry, NY
Glen Rock, NJ	Floral Park, NY
Hasbrouck Heights, NJ	Garden City, NY
Hopewell, NJ	Great Neck, NY
Irvington, NJ	Greenburgh, NY
Lawrence, NJ—paper & glass	Harrison, NY
Leonia, NJ	Irvington, NY
Lodi, NJ	Larchmont, NY
Long Beach, NJ	Mamaroneck, NY
Lyndhurst, NJ	Manhasset, NY
Millburn, NJ	Mount Kisco, NY
Metuchen, NJ	New Castle, NY
Montclair, NJ	New Rochelle, NY
Palisades Park, NJ	New York, NY
Paramus, NJ	North Hempstead, NY
Princeton, NJ—paper & glass	North Salem, NY—bottles & cans
Ridgewood, NJ	North Tareytown, NY
River Edge, Bergen, NJ	Oceanside, NY
Rutherford, NJ	Ossining, NY
Summit, NJ	Oyster Bay, NY
Tenafly, NJ	Peekskill, NY
Union City, NJ	Pelham Manor, NY
Upper Saddle River, Bergen, NJ	Peltham, NY

SEPARATE COLLECTION LOCATIONS—Con.

EPA Region II—Con.	
Pleasantville Village, NY	Spring Valley, NY
Rochester, NY	Tarrytown, NY
Rockville Centre, NY	Valley Stream, NY
EPA Region III	
N.W. Washington, DC	Alexandria, VA
Bowie, MD—bottles, cans, & newsprint	Arlington, VA
Greenbelt, MD	Lynchburg, VA
Rockville, MD	Salem, VA
Abington, PA—newspapers & clear glass	
Allentown, PA	
Delaware County, PA (pilot)	
EPA Region IV	
Miramar, FL (planning)	Greenville, SC
Louisville, KY	Benton County, TN
St. Matthews, KY	
EPA Region V	
Joliet, IL	Cincinnati, OH
Rockford, IL (rack)	Columbus, OH
Rolling Meadows, IL	Dayton, OH
Villa Park, IL	Wyoming, OH
Ann Arbor, MI	Green Bay, WI—glass, cans, & newsprint
Huntington Woods, MI	Madison, WI (rack)
Duluth, MN	Sheboygan, WI (rack)
Rochester, MN	Shorewood, WI
EPA Region VI	
Lawton, OK	El Paso, TX
Arlington, TX	Fort Worth, TX
Dallas, TX	University Park, TX
EPA Region VIII	
Kansas City, MO	Salt Lake City, UT
University City, MO	
EPA Region IX	
Atherton, CA	Pacifica, CA
Belmont, CA	Palm Springs, CA
Berkeley, CA	Phoenix, AZ
Burlingame, CA	Portola Valley, CA
Covina, CA	Rancho Palos Verdes, CA
Davis, CA	Redondo Beach, CA
Downey, CA—paper, glass, & cans	Redwood City, CA

NATIONWIDE RESOURCE RECOVERY ACTIVITIES

SEPARATE COLLECTION LOCATIONS—Con.

EPA Region IX—Con.

East Palo Alto, CA	Sacramento County, CA
Foster City, CA	San Anselmo, CA
Fullerton, CA	San Bernardino, CA
Half Moon Bay, CA	San Carlos, CA
Hillsborough, CA	San Diego, CA
Long Beach (NE), CA	San Francisco, CA
Menlo Park, CA	San Mateo, CA
Modesto, CA	Santa Maria, CA
Newport Beach, CA	Santa Rosa, CA
Oceanside, CA	G-Stanislaus County, CA
Ontario, CA	Tustin, CA

EPA Region X

G-Nez Perce County, ID

Code: G—EPA implementation grant.

Resource Recovery Activity Reports—Communities

AKRON, OHIO

PROJECT TYPE: Waterwall combustion

CAPACITY: 1,000 TPD, with possible expansion to 1,400 TPD

CAPITAL COST: \$43 million (1976)

PRODUCT/MARKETS: Steam/Heating loop; industrial markets

MAJOR EQUIPMENT MANUFACTURER: NA

CONTRACTOR: Teledyne National

METHOD OF FINANCING: Pollution control revenue bonds

PROJECT CONTACT: James A. Alkire, Director
Department of Planning and Urban Development
400 Municipal Building
166 S. High Street
Akron, Ohio 44308
(216) 375-2771

STARTUP DATE: NA

PROJECT STATUS

The city received bids for construction of the waterwall combustion facility and has selected Teledyne National as the contractor.

When completed, the project will supply steam to a central business district's heating system and to B.F. Goodrich, Inc. There is also the possibility that an additional steam market will be found with the University of Akron. If this materializes, the system's throughput will be increased to 1,400 TPD.

ALBANY, NEW YORK

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 600 TPD

CAPITAL COST: \$9 million (1976-77)

PRODUCTS/MARKET: RDF/Heating and cooling for the Office of General Services, Empire State Plaza

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTING ENGINEER: Smith and Mahoney, Inc.

METHOD OF FINANCING: 50% State bonds, 50% municipal general obligation bonds

STARTUP DATE: 1979

PROJECT CONTACT: Pat Mahoney, Consultant
Smith and Mahoney, Inc.
(518) 463-4107

PROJECT STATUS

A design study is now underway. Plant construction is to be completed (the Office of General Services is expected to complete construction of stoker-fired boilers) by 1979. The refuse will be accepted by the system at a dump fee of \$2.50 per ton. Refuse will be shredded and ferrous metals extracted, but it will not be air classified prior to firing. RDF will be supplied at a charge of 80 percent of the cost of No. 6 fuel oil. The city will also reimburse the State for the cost of constructing refuse-fired boilers rather than fossil fuel boilers. The estimated heating value of the fuel is 5,580 Btu/lb.

ALTOONA, PENNSYLVANIA

PROJECT TYPE: Compost

CAPACITY: 50 TPD (6 hours)

CAPITAL COST: NA

PRODUCTS/MARKETS: Humus/fertilizer manufactured for use as a carrier in lightweight fertilizer mixes (lawn and garden products)

MAJOR EQUIPMENT MANUFACTURER: Fairfield Engineering Co.

PRIME CONTRACTOR/CONSULTING ENGINEER: Fairfield Engineering Co.

METHOD OF FINANCING: Private capital

STARTUP DATE: 1963

PROJECT CONTACT: Daniel Detwiler
Plant Manager
(814) 942-8938

PROJECT STATUS

The plant is now operational on a pilot scale, but it is primarily a commercially operating plant for the Fairfield Engineering Company. The plant contracts with the city to handle the organic fraction (50 percent) of the city's waste (separate collection). The plant residuals (15 percent of input) are landfilled. The plant charges the city \$2,900 per month per 20-day operation. The system consists of shredding, air classification, magnetic separation, digesting (5 to 7 days), granulating, and pelletizing. The plant has also demonstrated the ability to handle sewage sludge.

AMES, IOWA

PROJECT TYPE: Refuse-derived fuel (RDF) with materials recovery

CAPACITY: 50 TPH

CAPITAL COST: \$5.6 million (1974)

PRODUCTS/MARKETS: RDF/Municipally owned power plant
Ferrous metals/Not selected
Aluminum/Not selected
Other metals/Not selected

CONSULTING ENGINEERS: Gibbs, Hill, Durham & Richardson, Inc.

METHOD OF FINANCING: General obligation bonds

STARTUP DATE: September 1975

PROJECT CONTACT: Arnold Chantland
Director, Department of Public Works
City Hall
5th and Kellogg Streets
Ames, Iowa
(515) 232-7479

PROJECT STATUS

Construction was completed in August 1975, and operation commenced in November 1975.

The 50-TPH waste processing facility processes 250 TPD of residential and commercial solid waste by two-stage shredding, air classification, screening, and electromagnetic separation to produce RDF and to recover ferrous metals, aluminum, other nonferrous metals, and glass-rich aggregate.

RDF is pneumatically transported to the adjacent 60-MW city-owned powerplant. All three of the plant's boilers have been modified to pneumatically fire RDF: a 360,000-lb/h steam output Combustion Engineering tangentially fired boiler; a 125,000-lb/h steam output Union Iron Works spreader stoker with a traveling grate; and a 95,000-lb/h steam output Riley spreader stoker with a traveling grate. The suspension-fired unit is equipped with an electrostatic precipitator, and the two stokers are equipped with multiple cyclones to control particulate emissions.

Bids will be solicited for the recovered materials once the facility has become fully operational and the quantity and quality of the products are better defined. The glass-rich residue will be used by the Department of Public Works as a supplemental aggregate for asphalt concrete pavement construction.

Major equipment vendors are as follows:

- Shredders: American Pulverizer Company
- Air classifiers: Rader Pneumatics Company
- Pneumatic conveying systems: Pneumatic Systems, Inc.
- Materials recovery systems: Combustion Power Company, Inc.

BALTIMORE COUNTY, MARYLAND

PROJECT TYPE: Refuse-derived fuel (RDF) and materials recovery

CAPACITY: 1,500 TPD

CAPITAL COST: \$10 million (1975)

PRODUCTS/MARKETS: RDF; ferrous metals

PRIME CONTRACTOR: Teledyne National, Inc.

METHOD OF FINANCING: State of Maryland: 50%; Baltimore County: 50%

STARTUP DATE: January 1976

PROJECT CONTACT: Dr. Cliff R. Willey
Maryland Environmental Service
60 West Street
Annapolis, Maryland 21401
(301) 267-5355

PROJECT STATUS

The Maryland Environmental Service (MES) has contracted with Baltimore County to mutually construct and operate a solid waste/refuse-derived fuel and materials recovery facility. Teledyne National has been selected as

the contractor. Half of the capital cost is being provided by the State of Maryland as a reimbursable grant, while the other half is being provided by Baltimore County out of current capital budgets. The county is providing the site for this facility and the landfill for the disposal of all residuals. MES will hold title to the facilities and be responsible for its operation until the grant has been reimbursed. Teledyne has a contract with MES to operate the facilities and is seeking markets for RDF and other products.

The net revenues from sales of RDF and other recovered materials will be shared by the State of Maryland (60 percent), Baltimore County (10 percent), and Teledyne (30 percent, to be reinvested in market and product development) until the State's reimbursable grant has been repaid. After repayment of the grant, Baltimore County will receive 70 percent of the new revenues and the operator of the plant, 30 percent.

The system of preprocessing and initial RDF and materials recovery was operational in early 1976 and processed approximately 550 TPD at startup. The system will be expanded in planned increments to 1,500 TPD.

BALTIMORE, MARYLAND

PROJECT TYPE: Pyrolysis (gaseous fuel)

CAPACITY: 1,000 TPD

CAPITAL COST: \$16 million (1974)

PRODUCTS/MARKETS: Steam; ferrous metal/Utility; Secondary Materials Company

CONTRACTOR: Monsanto Enviro-Chem Systems, Inc.

METHOD OF FINANCING: EPA grant: \$6 million; State loan: \$4 million; City funds: \$6 million

STARTUP DATE: January 1975

EPA PROJECT OFFICER: David Sussman, (202) 755-9150

PROJECT CONTACT: Carl Weinberger
Plant Manager
Pyrolysis Plant
1801 Annapolis Road
Baltimore, Maryland 21330
(301) 396-3499

PROJECT STATUS

Baltimore will own and operate a 1,000-TPD solid waste pyrolysis plant developed by Monsanto Enviro-Chem Systems, Inc. The LANDGARD system was designed and constructed by Monsanto under a turnkey contract with moneyback performance guarantee provisions. Monsanto is guaranteeing plant availability at 85 percent, particulate emissions to meet local and Federal standards, and the residue putrescible content to be less than 0.2 percent.

The plant is designed to handle mixed municipal solid waste, including tires and white goods. All incoming waste will be shredded to a 4-inch particulate size and then conveyed to a rotary pyrolysis kiln.

The pyrolysis gases will leave the kiln and then be combusted in an afterburner. The hot afterburner exhaust gases will pass through waste heat boilers that generate 200,000 lb/h for sale to the Baltimore Gas and Electric Company. The steam will be used for downtown heating and cooling. Boiler exhaust gases will be scrubbed, dehumidified, and released to the atmosphere.

During startup operations that began in January 1975, it became apparent that operating parameters at the plant were significantly different from those experienced in the 35-TPD prototype on which the design of the Baltimore plant was based. These differences resulted in a lowered plant availability and an unacceptably high level of air emissions.

Modifications to the plant to correct the scale-up anomalies are being carried out at this time, and it is anticipated that startup will be in late 1976. The air emission problem will be corrected with an additional air pollution control device.

Funding for the modifications and for the air pollution control device will come from the \$4 million performance guarantee of Monsanto, an additional \$1 million from EPA, and the remainder from the city. Total cost for all modifications is estimated at \$9.6 million.

BEVERLY, LYNN, AND SALEM, MASSACHUSETTS

PROJECT TYPE: Waterwall combustion

CAPACITY: 500 TPD

CAPITAL COST: NA

PRODUCTS/MARKET: Steam; electricity/Industry; New England Power

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTING ENGINEER: Metcalf & Eddy, Inc.

METHOD OF FINANCING: NA

STARTUP DATE: 1979-80

PROJECT CONTACT: Phillip Patterson
Commissioner of Public Works
City Hall
Beverly, Massachusetts 01915
(617) 922-0352

PROJECT STATUS

The city of Beverly is currently negotiating with the Emhart Corp. for the purchase of steam or electricity from a resource recovery facility to be constructed on that company's site. The city of Beverly, together with the

neighboring towns of Salem and Lynn, has contracted with a consultant to draw up an RFP for the design, construction, and operation of a facility. The facility may be built using funds made available through the State's Industrial Development Authority. The RFP was published in spring 1976, although some questions remain concerning the amount of solid waste available to the facility.

BLYTHEVILLE, ARKANSAS

PROJECT TYPE: Modular combustion

CAPACITY: 50 TPD (4 modular units)

CAPITAL COST: \$800,000 (1975)

PRODUCT/MARKET: Steam/metal-plating industry

MAJOR EQUIPMENT MANUFACTURER: Consumat Inc.

PRIME CONTRACTOR: U.S. Recycle Corp.

METHOD OF FINANCING: Municipal bonds

STARTUP DATE: November 1975

CITY CONTACT: Robert Aguiar
Assistant to the Mayor
City of Blytheville, Arkansas
(501) 763-3602

PROJECT STATUS

The unit is currently in operation producing and selling 240,000 lb of steam per 10-hour day, 5 days per week. The unit is operated for 10 hours, then allowed to cool down overnight. The next morning the residue is removed prior to starting operations. Small incinerators (less than 50 TPD) employ two separate chambers to accomplish incineration. First the waste is gasified by using auxiliary fuel and a controlled amount of air. The gases are then combusted and the heat recovered by means of a steam generating unit. Tests of air emissions have shown that these units conform with new source performance standards for incinerator particulate emissions.

Modular combustion units (small incinerators) using municipal solid waste as fuel and employing heat recovery are also in operation at Siloam Springs, Arkansas, and Groveton, New Hampshire.

BRAINTREE, MASSACHUSETTS

PROJECT TYPE: Waterwall combustion

CAPACITY: 240 TPD

CAPITAL COST: \$2.5 million (1970)

PRODUCT/MARKET: Steam/industry

CONSULTING ENGINEER: Camp, Dresser & McKee, Inc.

METHOD OF FINANCING: General obligation bonds

STARTUP DATE: 1971

PROJECT CONTACT: John Griffith, Superintendent
Braintree Thermal Waste Reduction Center
Ivory Street
Braintree, Massachusetts 02184
(617) 843-6209

PROJECT STATUS

The plant has been operational since 1971, but until recently no steam was being sold. The community then developed a market for steam with the Weymouth Art and Leather Company (20,000 to 25,000 lb/h or 400,000 lb per day) and was negotiating with Michigan Abrasives, Inc., for an equal supply of steam. Initially, the plant's net operating costs were \$30 per ton, but recent net operating costs were \$5 per ton, processing 150 to 175 tons of waste per day on a three-shift, 5-day-per-week basis.

The system was designed with an electrostatic precipitator as the air pollution control device and could control particulate emissions to the standard that was in effect at the time of 0.2 gr/DSCF corrected to 12 percent CO. Since that time, the State has imposed a new standard of 0.05 gr/DSCF corrected to 12 percent CO on all incinerators in the State.

The plant was not in compliance with the new standard, and an administrative order was issued to Braintree by EPA. The order required the plant to meet the State standard by May 1, 1976, or cease operations until compliance is achieved. Braintree attempted to bring the emissions into compliance by upgrading the installed electrostatic precipitators but was unable to meet the EPA deadline. They are still in the process of upgrading their electrostatic precipitators, but until they do so, the facility will remain closed and Braintree will continue to landfill its waste.

BRIDGEPORT, CONNECTICUT

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 1,800 TPD

CAPITAL COST: \$52 million (includes transportation, demolition, utility boiler modifications, capitalized interest, financing, and engineering costs) (1975)

PRODUCTS/MARKETS: RDF/United Illuminating Co.
Ferrous/NA
Glass/NA
Aluminum/NA

PRIME CONTRACTORS: Joint venture: Occidental Research Corporation and Combustion Equipment Associates, Inc.

METHOD OF FINANCING: Industrial revenue bonds through Resource Recovery Authority

STARTUP DATE: NA

PROJECT CONTACT: Richard Chase
Connecticut Resources Recovery Authority
60 Washington Street
Suite 1305
Hartford, Connecticut 06106
(203) 599-6390

PROJECT STATUS

The plant is scheduled to be in operation in early 1978. Connecticut Resources Recovery Authority (CRRA) signed a contract with Occidental Research Corporation and Combustion Equipment Associates, Inc., on March 31, 1976. The corporate joint ventures will process approximately 1,800 TPD of waste into an RDF product. The product will be sold to United Illuminating Co. in Bridgeport. Glass, ferrous metals, and aluminum will also be recovered.

The project will process wastes generated in the towns of Bridgeport, Darien, Easton, Fairfield, Greenwich, Monroe, Stratford, Trumbull, and Westport. These towns have signed an interlocal agreement with CRRA. CRRA, in turn, signed the contract with the corporations.

A history of the Bridgeport project and an analysis of an earlier draft of the CRRA/Occidental Research Corporation contract are contained in the EPA publication listed below. The final contract, however, is reported to be substantially different from the draft that was analyzed.

Randol, R. E. *Resource Recovery Plant Implementation: Guides for Municipal Officials—Risks and Contracts*. Environmental Protection Publication SW-157.7. [Washington], U.S. Environmental Protection Agency, 1976. 52 p.

CENTRAL CONTRA COSTA COUNTY, CALIFORNIA

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 1,000 TPD

CAPITAL COST: NA

PRODUCT/MARKET: RDF/Sewage sludge incineration

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTING ENGINEER: Brown and Caldwell, Inc.

METHOD OF FINANCING: NA

STARTUP DATE: July 1979

PROJECT CONTACT: G. A. Hortskotte, Jr.
General Manager, Chief Engineer
Central Contra Costa Sanitary District
P.O. Box 5266
Walnut Creek, California 94596
(415) 934-6727

PROJECT STATUS

The county scheduled a test burn of RDF in a sludge incinerator in February 1976. Tests should be complete by the fall of 1976, when, if successful, the construction phase will commence. The system will shred to 1-inch size and separate out light fraction, which will be piped as fuel to a nearby sludge-burning facility. Ferrous metal will also be recovered.

CHEMUNG COUNTY, NEW YORK

PROJECT TYPE: Refuse-derived fuel (RDF) or modular combustion unit

CAPACITY: 200 TPD

CAPITAL COST: NA

PRODUCT/MARKET: RDF or steam/NA

MAJOR EQUIPMENT MANUFACTURER: Americology, air classifier
Jeffrey Mfg. Co., shredders

PRIME CONTRACTOR/CONSULTING ENGINEER: O'Brien and Gere Engineers, Inc.

METHOD OF FINANCING: NA

STARTUP DATE: NA

PROJECT CONTACT: Robert Roller, General Manager
Chemung County Solid Waste Disposal District

1690 Laice Street
Elmira, New Mexico 14901
(607) 737-2980

PROJECT STATUS

The project involves testing an air classifier. The county has been operating a milling facility since December 1973. A feasibility study completed in 1974 recommended the installation of an air classifier to enable the sale of the fuel fraction to a nearby utility. The county has contracted with Americology to test a 30-TPH air classifier for a period of 1 year. Tests should be completed during the summer of 1976. The county is now negotiating for enough solid waste throughput to satisfy potential market demands for the fuel fraction.

CHICAGO, ILLINOIS (CRAWFORD)

PROJECT TYPE: Refuse-derived fuel (RDF) with ferrous recovery

CAPACITY: 1,000 TPD

CAPITAL COST: \$16 million (1975)

PRODUCTS/MARKETS: RDF/Commonwealth Edison Company
Ferrous metals/NA

CONSULTING ENGINEERS: Ralph M. Parsons Co.; Consoer Townsend & Associates

METHOD OF FINANCING: General obligation bonds

STARTUP DATE: Late 1976

PROJECT CONTACT: Robert Keleher
Senior Research Analyst
Bureau of Sanitation
City Hall
Chicago, Illinois 60602
(312) 744-5038

PROJECT STATUS

Construction, delayed by a concrete industry strike, is due to be completed by late 1976.

The processing plant will use Williams primary shredders, Eidal secondary shredders, and Triple/S air classifiers. The plant will have two identical lines, each capable of handling 1,000 tons per 8-hour shift. This allows for redundancy and for excess capacity for future increases in waste feed.

Initially, ferrous metals will be the only material recovered. The processing plant is designed to allow for the addition of other materials recovery processes as they are proved to be technically and economically feasible.

The RDF is pneumatically conveyed to the adjacent Commonwealth Edison Company Crawford Power Station. Two Combustion Engineering tangentially fired boilers will be modified to accept RDF. These units are equipped with electrostatic precipitators to control particulate emissions.

Commonwealth will be responsible for operating and maintaining the RDF receiving, storage, and firing equipment. The city will fund the capital cost of RDF receiving, storage, and firing equipment, and boiler modifications. Commonwealth has agreed to pay about 30 cents per million Btu for the RDF, which is about 40 percent of the cost of coal.

CHICAGO, ILLINOIS (SOUTHWEST)

PROJECT TYPE: Refractory incinerator with waste heat boiler

CAPACITY: 1,200 TPD

CAPITAL COST: \$6.8 million (1962)

PRODUCTS/MARKETS: Steam; ferrous metals/Produce terminal; manufacturing district

CONTRACTOR: NA

METHOD OF FINANCING: General obligation bonds

STARTUP DATE: 1963

PROJECT CONTACT: Jim Castle, Mechanical Engineer
Street and Sanitation Dept.
City Hall
Chicago, Illinois 60602
(312) 744-4587

PROJECT STATUS

The Southwest facility is currently operating on a three-shift schedule 7 days a week. The plant consists of four rotary kiln refractory lined furnaces, each equipped with a waste heat boiler. Steam is marketed primarily during the winter months. Approximately 25 percent of the steam capacity (150,000 lb/h) is used in the plant for heating. The plant is now operating under a variance regarding particulate emission and will be phased out in 1977, when the Crawford RDF plant commences operation.

DADE COUNTY, FLORIDA

PROJECT TYPE: Wet process RDF/generation of electricity

CAPACITY: 3,000 TPD

CAPITAL COST: \$82 million

PRODUCT/MARKETS: Electricity/Florida Power and Light Company; Fe, Al, steam

PRIME CONTRACTOR: Black Clawson Fibreclaim, Inc.

METHOD OF FINANCING: State general obligation bonds

STARTUP DATE: January 1979

PROJECT CONTACT: Christopher Tyson
Public Works Department
Metropolitan Dade County
Brichell Plaza
909 Southeast First Avenue
Miami, Florida 33131
(303) 358-2700

PROJECT STATUS

The county reviewed 10 responses to its RFP and negotiated with UOP and Black Clawson, finalists, for the construction and operation of a 3,000-TPD facility that will produce steam to power a turbogenerator. In June 1976, the county recommended Black Clawson to the county commissioner as the winner of the bid competition. The county is still negotiating with Florida Power and Light Company for sale of the steam or electricity and the purchase of the turbogenerator.

DETROIT, MICHIGAN

PROJECT TYPE: Waterwall combustion

CAPACITY: 3,000 TPD

CAPITAL COST: NA

PRODUCT/MARKET: Steam, electricity/utility

MAJOR EQUIPMENT MANUFACTURER: NA

PRIME CONTRACTOR/CONSULTING ENGINEER: NA

METHOD OF FINANCING: Industrial revenue bonds

STARTUP DATE: NA

EPA PROJECT OFFICER: Laurence B. McEwen
(202) 755-9150

PROJECT CONTACT: Michael Brinker
Environmental Protection and Maintenance Department
513 City-County Building
Detroit, Michigan 48226
(313) 224-3932

PROJECT STATUS

The city issued an RFP on April 1, 1976, inviting 10 prequalified corporations to submit proposals to build a steam-generating facility. The facility will process 3,000 or 5,700 TPD of solid waste. The city now collects 3,000 TPD and is negotiating for an additional 2,700 TPD from surrounding communities.

The facility will either mass-burn or prepare and burn an RDF product to produce steam. The market for the steam will be either the Detroit Edison Co. or the city-owned Public Lighting Department. The MITRE Corporation has been hired to help evaluate responses to the RFP, with the assistance of an implementation grant from the U.S. Environmental Protection Agency.

EAST BRIDGEWATER, MASSACHUSETTS

PROJECT TYPE: Refuse-derived fuel

CAPACITY: 20 TPH

CAPITAL COST: Not known

PRODUCT/MARKET: Eco-fuel II/Industrial boiler

CONTRACTOR: Combustion Equipment Associates

METHOD OF FINANCING: Private capital

STARTUP DATE: Early 1976

PROJECT CONTACT: Richard Valonino
Resource Recovery Division
Combustion Equipment Associates
555 Madison Avenue

New York, New York 10022
(212) 980-3700

PROJECT STATUS

Combustion Equipment Associates (CEA) is constructing a 20-TPH waste processing system in East Bridgewater to produce a high-quality fuel for use as a fossil fuel supplement. The fuel, called Eco-fuel II by CEA, is reported to have a heat value of 7,800 to 8,000 Btu/lb, a moisture content of 2 to 5 percent, an ash content of 5 to 9 percent (wet weight), and a particulate size of 80 percent minus 20 mesh.

The facility is scheduled to be operating at design capacity in 1976. The Eco-fuel II will be trucked 75 miles to a Fitchburg, Mass., plant, where it will be pneumatically fired into Babcock & Wilcox, and Riley suspension fired boilers designed for coal firing. The boilers are now burning No. 6 oil. Eco-fuel II will provide 60 percent of the heat input rate. Although CEA is investigating the feasibility of Eco-fuel II/oil slurries, the Eco-fuel will not be premixed for the existing project.

FRANKLIN, OHIO

PROJECT TYPE: Wet pulp

CAPACITY: Currently 50 TPD (one shift) (capacity 150 TPD per 24-hour shift)

CAPITAL COST: \$3.4 million (1970)

PRODUCTS/MARKETS: Fiber; ferrous metal; glass/See below

CONTRACTORS: Black Clawson Fibreclaim, Inc.; Glass Container Manufacturer Institute

METHOD OF FINANCING: EPA demonstration grant: \$1.936 million

STARTUP DATE: June 1971

EPA PROJECT OFFICER: Yvonne Garbe, (202) 755-9140

PROJECT CONTACT: B. Eichholtz, City Manager
City of Franklin
P.O. Box 132
Franklin, Ohio 45005

PROJECT STATUS

The project is currently operational. The total system comprises three subsystems for solid waste disposal, fiber recovery, and glass recovery. In the system, a hydropulper wet-pulps the refuse, after which a magnetic separator recovers the ferrous metals. Next, a liquid cyclone extracts other heavy elements, such as glass, rocks,

and nonferrous metals. The remaining fiber is then cleaned and dewatered in the fiber recovery system. Unrecoverable material is piped to the fluidized bed incinerator for disposal. The fiber is sold to the Logan Long Company for \$45 per ton; the ferrous metal is sold to the Gillerman Steel Corporation in St. Louis, Missouri, for \$25 per ton.

In June 1975, the glass recovery subsystem underwent modifications to improve the quality of the recovered glass product. Startup of this subsystem began in August 1975. The demonstration ended in April 1976.

For additional information, the reader is referred to the following publication: Arella, D. G. *Recovering Resources From Solid Waste Using Wet-Processing*; EPA's Franklin, Ohio, Demonstration Project. Environmental Protection Publication SW-47d. Washington, U.S. Government Printing Office, 1974. 26 p.

Arella, D. G. *The Franklin Ohio, Demonstration Report* Environmental Protection Publication SW-47d, Washington, U.S. Environmental Protection Agency, 1974.

GROVETON, NEW HAMPSHIRE

PROJECT TYPE: Modular combustion

CAPACITY: 30 TPD

CAPITAL COST: \$250,000 (1975)

PRODUCT/MARKETS: Steam/paper mill (process and space heating)

MAJOR EQUIPMENT MANUFACTURERS: Environmental Control Products, Inc., Eclipse Boilers

PRIME CONTRACTOR/CONSULTING ENGINEER: Groveton Paper Products, division of Diamond International

METHOD OF FINANCING: Private purchase

STARTUP DATE: October 1975

PROJECT CONTACT: Mr. Livingston, Executive Vice President
Groveton Paper Mill, Inc.
Groveton, New Hampshire
(603) 636-1154

PROJECT STATUS

The plant is currently operating at less than design capacity due to lack of waste. The facility burns plant waste 5 days a week and disposes of all of the city's municipal waste 1 day a week. The facility is currently providing 4,000 to 6,000 lb/h of 125 PSIG steam, which is a small percentage of the paper mill's process steam requirements.

The unit is equipped with automatic ash handling capability, which permits 24-hour per day operation. The device employs two-stage incineration, using controlled air to achieve gasification and combustion in separate chambers. Auxiliary fuel (gas or oil) is required to achieve 1,800° to 2,200° F chamber temperatures.

Modular combustion units (small incinerators) using municipal solid waste as fuel and employing heat recovery are also in operation at Blytheville and Siloam Springs, Arkansas.

HACKENSACK MEADOWLANDS, NEW JERSEY

PROJECT TYPE: Refuse-derived fuel (RDF) with ferrous metals recovery

CAPACITY: 2,500 TPD

CAPITAL COST: Not defined

PRODUCTS/MARKETS: RDF/Public Service Electric and Gas Company
Ferrous metals/not selected

CONTRACTOR: Not selected

METHOD OF FINANCING: Revenue bonds

STARTUP DATE: Not defined

PROJECT CONTACT: George Casino
Chief Engineer
Hackensack Meadowlands Development Commission
1099 Wall Street, West
Lyndhurst, New Jersey 07071
(201) 935-3250

PROJECT STATUS

A contractor for the commission is completing a preliminary design of a 2,500-TPD facility that will produce an RDF and recover ferrous metals. Public Service Electric and Gas Company plans to accept the RDF.

This planned facility is part of a waste management program designed to handle the 8,000 TPD of waste disposed in the Meadowlands. In the future, the commission plans to implement a 3,000-TPD baling and landfilling project, and another 2,500-TPD resource recovery project.

HARRISBURG, PENNSYLVANIA

PROJECT TYPE: Waterwall combustion

CAPACITY: 720 TPD

CAPITAL COST: \$8.3 million (1972)

PRODUCTS/MARKET: Steam/no current market

MAJOR EQUIPMENT MANUFACTURER: I.B.W. Martin Systems

PRIME CONTRACTOR: International-Noonan Inc.

METHOD OF FINANCING: Revenue bonds

STARTUP DATE: October 1972

PROJECT CONTACT: Mr. Gary Brenton
Gannett, Fleming, Corrdry & Carpenter
(717) 238-0451

PROJECT STATUS

The plant is operational, handling 3,000 tons per week utilizing one of two boilers. The plant is capable of producing 200,000 lb/h of steam, 50,000 pounds of which is used onsite for heating, shredding, and auxiliary turbine operation.

The city is negotiating for the sale of steam to the Pennsylvania Power and Light Company to supplement current heating steam supplies. The use of 20,000 lb/h of steam to dry sewage sludge will be incorporated commencing in 1979. The dried sludge will then be combusted in the plant.

The city accepts all solid waste, including appliances and tires, charging a flat dump fee of \$12.80 per ton. Particulate air emissions from installed electrostatic precipitators have been measured at .075 gr/dstdft³, which complies with both State and Federal standards.

HEMPSTEAD, NEW YORK

PROJECT TYPE: Wet process RDF

CAPACITY: 2,000 TPD

CAPITAL COST: \$73 million resource recovery plant (1976), \$8 million electrical generation plant

PRODUCTS/MARKETS: Electricity/utility; Fe, Al, glass

METHOD OF FINANCING: \$46 million, Industrial revenue bonds
\$27 million, Black Clawson Fibreclaim, Inc.
\$ 8 million, Long Island Lighting Co.

CONTRACTOR: Hempstead Resource Recovery Corp. (a subsidiary of Black Clawson Corp.)

STARTUP DATE: NA

PROJECT CONTACT: William Landman
Commissioner of Sanitation
1600 Merrick Road
Merrick, New York 11566
(516) 378-4210

PROJECT STATUS

A contract was signed on December 12, 1974, between the city of Hempstead and Hempstead Resource Recovery Corporation, a subsidiary of Black Clawson Corporation. The contract stipulates that the city "put or pay" to the recovery system at least 6,000 tons of solid waste per week. The contract also requires the corporation to be capable of processing 11,000 tons per week with a maximum of 3 percent residue by volume. The system will recover ferrous metals, aluminum, and glass (if economically feasible), and will produce electricity. Revenues will be shared between the corporation and the city. Dump fees, depending on tonnages, will range between \$14.05 to \$12.37 per ton, subject to cost increases due to inflation.

The tax-exempt status of Hempstead Pollution Control Revenue Bonds has been affirmed by an IRS ruling. Financing was closed in May 1976, and ground breaking took place on May 26, 1976.

HONOLULU, HAWAII

PROJECT TYPE: Undecided

CAPACITY: 2,000 TPD

CAPITAL COST: NA

PRODUCTS/MARKET: RDF

CONSULTANTS: Sunn, Low, Tom & Hara, engineers; Mitre Corp., management; White, Weld & Co., financial.

METHOD OF FINANCING: General obligation or pollution control revenue bonds

STARTUP DATE: NA

PROJECT CONTACT: Kazu Hayashida
Chief, Public Works Department
City and County of Honolulu
Honolulu, Hawaii
(808) 546-7514

PROJECT STATUS

The city and county of Honolulu, Amfac Corporation, and the Hawaiian Electric Company have jointly funded a feasibility study to investigate the possibility of utilizing mixed refuse and cane trash for the generation of power. Amfac Corporation is one of Hawaii's largest private corporations and a major sugar cane grower. The study was completed in December 1975 and concluded that several systems were both technologically feasible and economically viable, and outlined steps for implementation. A subsequent study by the State of Hawaii has endorsed this project. The city expects to issue an RFP in 1976.

LANE COUNTY, OREGON

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 500 TPD

CAPITAL COST: \$2 Million (1976)

PRODUCTS/MARKETS: RDF; ferrous metals/Industry or utility boilers

MAJOR EQUIPMENT MANUFACTURER: Allis-Chalmers

PRIME CONTRACTOR: Allis-Chalmers

METHOD OF FINANCING: General obligation bonds

STARTUP DATE: Fall 1977

EPA PROJECT OFFICER: Richard Hopper, (202) 755-9150

PROJECT CONTACT: Bruce Bailey
Solid Waste Division
County Annex Building
135 E. 6th Avenue
Eugene, Oregon 97401
(503) 687-4119

PROJECT STATUS

Allis-Chalmers was selected as the winning bidder to the county's RFP, and construction was scheduled to begin in November 1976.

The facility will be part of a \$5 million solid waste plan also incorporating a new landfill site and the construction of a transfer station.

The process will include shredding, magnetic separation, and classification. The potential markets for the fuel portion include a university, utility, and industry. All are now burning low-cost wood residues in boilers designed for this fuel. Lane County is a recipient of a grant from EPA to assist in the implementation process.

LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT, KENTUCKY

PROJECT TYPE: Waterwall combustion

CAPACITY: 1,050 TPD

CAPITAL COST: NA

PRODUCTS/MARKETS: Steam; ferrous metals/Industrial heating and cooling

MAJOR EQUIPMENT MANUFACTURER: Undetermined

CONSULTING ENGINEERS: Proctor-Davis-Ray, Inc.

METHOD OF FINANCING: Undetermined

STARTUP DATE: NA

EPA PROJECT OFFICER: Laurence B. McEwen, Jr., (202) 755-9150

PROJECT CONTACT: Gordon Garner
Commissioner for Sanitation and Public Works
Municipal Building
136 Walnut Street
Lexington, Kentucky 40507
(606) 255-5631

PROJECT STATUS

The Lexington-Fayette Urban County Government is examining bids for boiler units and electrostatic precipitators and developing a cost estimate for the proposed system. After approval of these bids, the consultants will continue with the final design before issuing RFP's for construction and the remaining equipment. The plant will be located in an industrial area, and memoranda of understanding for the purchase of steam for heating and cooling have been signed with nine industries.

EPA has awarded a grant to the county government to assist in the implementation of the proposed resource recovery system.

MEMPHIS, TENNESSEE

PROJECT TYPE: Waterwall combustion

CAPACITY: 2,000 TPD

CAPITAL COST: \$105 million

PRODUCTS/MARKETS: Steam/downtown buildings
Chilled water/downtown buildings

CONSULTING ENGINEER: Ellers, Fanning, Oakley, Chester & Rike, Inc.

METHOD OF FINANCING: Revenue bonds (anticipated)

STARTUP DATE: NA

PROJECT CONTACT: Ray Franks
Memphis Light, Gas & Water
P.O. Box 430
Memphis, Tennessee 38101
(901) 528-4340

PROJECT STATUS

The Memphis City Council has endorsed a plan submitted by Memphis Light, Gas & Water (MLGW) to build a 2,000-TPD waterwall incinerator. The energy recovery system will produce steam and chilled water, which will be distributed through a downtown heating and cooling loop.

MLGW has hired a consulting engineer to refine their preliminary feasibility study. The consulting engineer is reviewing capital costs for the facility as well as projected operating and maintenance costs. MLGW is securing long-term market contracts for the product.

MERRICK, NEW YORK

PROJECT TYPE: Refractory incinerator with heat recovery

CAPACITY: 600 TPD

CAPITAL COST: \$3 million (1952)

PRODUCT/MARKET: Electricity/in-house use

CONTRACTOR: NA

METHOD OF FINANCING: NA

STARTUP DATE: 1952

PROJECT CONTACT: Mr. William Landman
Commissioner, Dept. of Sanitation
1600 Merrick Rd.
Merrick, N.Y. 11566
(516) 378-4210

PROJECT STATUS

Steam produced in this incinerator is fed to two turbogenerators capable of producing 1,500 kW. An auxiliary diesel generator set supplies backup power. The electricity is used within the facility, primarily for lighting, for crane operation, and for the electrostatic precipitator to control particulate emissions.

MIAMI, FLORIDA

PROJECT TYPE: Refractory incinerator with steam generator

CAPACITY: 900 TPD

CAPITAL COST: \$2.5 million (1955)

PRODUCT/MARKET: Steam/Hospital

CONSULTING ENGINEERS: Nicholas Engineering & Research Inc.

METHOD OF FINANCING: General obligation bonds

STARTUP DATE: 1956

PROJECT CONTACT: Mr. Don Moss, Assistant Director
Department of Sanitation
City of Miami
1950 N.W. 12th Ave.
Miami, Florida 33136

PROJECT STATUS

This facility, based on a design for the incineration of sludge, consists of six 150-TPD units. The plant operates on three shifts per day, 5 days per week. The hospital is equipped with a standby boiler to supply its steam needs on weekends. The incinerator utilizes approximately 30 percent of its steam supply in-house. The plant will be phased out by a transfer station that will be supplying waste to the Dade County resource recovery facility.

MILWAUKEE, WISCONSIN

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 1,200 TPD (140 TPH)

CAPITAL COST: \$14 million at plant (1975); \$4 million at electrical power station (1974)

PRODUCTS/MARKETS: Shredded fuel for supplemental burning in Wisconsin Electric Power Co. boilers; ferrous, glass, aluminum, hand-picked newspaper, and corrugated paper.

CONTRACTOR: American Can Company (Prime subcontractor: Bechtel Corp.)

METHOD OF FINANCING: Private (American Can Company)

STARTUP DATE: Early 1977

PROJECT CONTACT: Donald Roethig
Deputy Commissioner of Public Works
Room 516, Municipal Building
Milwaukee, Wisconsin 53202
(414) 278-3302

PROJECT STATUS

The plant is currently under construction. In January 1975, contracts were signed between the city of Milwaukee, American Can, and Wisconsin Electric Power, in which the utility agreed to purchase shredded fuel from a facility to be built and operated by the Americology Division of American Can Company. American Can's responsibility to operate transfer stations and dispose of Milwaukee's solid waste commenced in January 1976.

American Can Company will own and operate the plant and will charge the city a disposal fee of \$8.60 per ton (1975) that will be coupled to the Consumer Price Index. The contractor will retain all product revenues minus 10 percent of RDF sales. The contract may be renegotiated in 1982 after capital and operating costs are established. Between 1982 and 1986, as a result of new State legislation, the State Solid Waste Recycling Authority may eventually take over this plant and integrate it into a statewide system. The city will have an option to buy the plant.

MINNEAPOLIS-ST. PAUL MINNESOTA

PROJECT TYPE: Waterwall combustion

CAPACITY: 1,200 TPD

CAPITAL COST: \$50 million (1978)

PRODUCT/MARKET: Steam/Paper mills

MAJOR EQUIPMENT MANUFACTURER: Wheelabrator-Frye, Inc.

PRIME CONTRACTOR: NA

METHOD OF FINANCING: Private revenue bonds

STARTUP DATE: 1980

PROJECT CONTACT: Irving Stern
Vice President, Phoenix Inc.
Suite 124, 7900 Xerxes Ave. S.
Minneapolis, Minnesota 55431
(612) 835-1005

PROJECT STATUS

The major equipment manufacturer has been selected, and requests for necessary building permits are expected to be filed by mid-1976. The facility will be owned and operated by a new corporation, Twin Resco, made up of a local solid waste management firm (Phoenix Industries), a major equipment manufacturer (Wheelabrator-Frye, Inc.), and a market outlet (Hoesner Waldorf Corp.). The facility will process waste from the Twin Cities, with capacity to service yet unspecified surrounding counties. Steam operated by the plant will be used in two paper mills located in St. Paul.

The feasibility of a second plant is being evaluated by neighboring Hennepin County. A study for that facility has been completed by Henningson, Durham and Richardson. The facility would also employ WWI to provide steam for three area hospitals, the University of Minnesota, and an industrial park. The plant is expected to cost \$55 million and would process 1,800 TPD.

A third facility, planned by the Metropolitan Waste Control Commission and employing pyrolysis to treat solid waste with sewage sludge, has been canceled.

MONROE COUNTY, NEW YORK

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 2,000 TPD (140 TPH)

CAPITAL COST: \$30 million at plant; \$5 million at electrical power station (1976)

PRODUCTS/MARKET: RDF/Rochester Gas & Electric Co.; ferrous metals, aluminum, glass

MAJOR EQUIPMENT MANUFACTURER: NA

CONTRACTOR/CONSULTING ENGINEERS: Raytheon Service Company/Black, Crow, and Eidsness

METHOD OF FINANCING: Public improvement bonds, plus \$15 million from the State

STARTUP DATE: December 1978

PROJECT CONTACT: Harold Christensen
Director of Solid Waste
Department of Public Works
200 County Office Building
Rochester, New York 14614
(716) 461-3160

PROJECT STATUS

Bid documents for construction are being prepared. Construction is scheduled to start in late 1976. The Raytheon Service Company has been contracted to perform the following services for Monroe County:

- Design the recovery plant.
- Assist in the competitive bidding of plant equipment and construction.
- Supervise construction activity for the county.
- Startup and shakedown the plant.
- Operate it and market products for 5 years.

Both Camp, Dresser, and McKee and Raytheon's United Engineers have been involved under subcontract to Raytheon, which has primary responsibility for engineering design.

Black, Crow, and Eidsness are currently acting as the technical liaison between the county and the contractor.

MONTGOMERY COUNTY, MARYLAND

PROJECT TYPE: Refuse-derived fuel (RDF) with materials recovery

CAPACITY: 1,200 TPD

CAPITAL COST: NA

PRODUCTS/MARKETS: RDF: Potomac Electric Power Company
Other materials: Not selected

CONSULTING ENGINEERS: Gannet, Fleming, Corddry, and Carpenter, Inc.

METHOD OF FINANCING: NA

STARTUP DATE: NA

PROJECT CONTACT: F. K. Erickson
Office of Environmental Planning
Montgomery County Office Building
Rockville, Maryland 20850
(301) 279-1316

PROJECT STATUS

Gannet, Fleming, Corddry, and Carpenter, Inc., have been engaged to develop an engineering design of a 1,200-TPD processing facility. The facility will produce an RDF and recover ferrous metals. In addition, consideration is being given to recovery of aluminum and glass.

The county is negotiating with Potomac Electric Power Company (PEPCO) to use either boilers currently operating at the Dickerson, Maryland, power station, or a new 800-MW unit at the station that is scheduled to be operating in 1982.

The county council has called for a review of the economics of the project and will compare this project with an alternative involving rail haul to a remote landfill.

MONTGOMERY COUNTY (DAYTON), OHIO

PROJECT TYPE: Refuse-derived fuel (RDF) or waterwall incineration

CAPACITY: 2,000 TPD

CAPITAL COST: Approximately \$40 million (1976)

PRODUCT/MARKETS: Utility, industry, or military facility

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTANTS: Ralph Woolpert Inc., engineering; White, Weld, & Co., financial; Peck, Schafer & Williams, bond counsel; Anderson & Schorr, marketing

METHOD OF FINANCING: Pollution control revenue bonds

STARTUP DATE: NA

EPA PROJECT OFFICER: Richard Hopper, (202) 755-9150

PROJECT CONTACT: Ernest Philpot, Administrator
County Sanitary Department
Montgomery County Administration Building
Dayton, Ohio 45402
(513) 225-4933

PROJECT STATUS

Montgomery County, Ohio, is proposing to build two shredded-fuel facilities: one at its north incinerator and one at its south incinerator. Both are located just off I-75, the major arterial dividing the city of Dayton.

Both incinerators were built in 1970 at a total cost of \$12 million. In 1973, however, the State informed the county that both incinerators failed to meet air quality standards and that either they would have to be closed down or electrostatic precipitators added at a cost of \$8 million.

Rather than modify the incinerators, the county decided to convert them to resource recovery facilities. Based upon a feasibility study done by the county, it was estimated that this would cost \$10 million.

In June 1975, the county issued a draft RFP that listed four procurement options:

1. Construction only: RDF
2. Design and construction: RDF
3. Design, construction, and operation: any system
4. Financing, design, construction, and operation: any system

The RFP was issued in early 1976 and was modified subsequently to include only a full-service option and other changes suggested by EPA.

Montgomery County has had discussions with several potential markets, including

- Dayton Power and Light
- Cargill Corporation
- Wright-Patterson Air Force Base
- Southwestern Ohio Portland Cement Company

The county is in the process of securing contracts with its constituent municipalities that will give it control of the county's waste stream.

EPA has awarded a grant to Montgomery County to assist in the implementation of the proposed resource recovery system.

MOUNTAIN VIEW, CALIFORNIA

PROJECT TYPE: Landfill gas recovery

CAPACITY: 1 MCF per day

CAPITAL COST: \$616,000

PRODUCT/MARKET: Methane/Pacific Gas & Electric Co.

PRIME CONTRACTOR: Pacific Gas & Electric Co.

METHOD OF FINANCING: Pacific Gas & Electric Co. and EPA grant.

STARTUP DATE: January 1977

PROJECT CONTACTS: Max J. Blanchet
Senior Resources Engineer
Pacific Gas & Electric Company
245 Market Street
San Francisco, California 94106
(415) 781-4211, Ext. 3151

John A. Carlson
Resident Engineer
Dept. of Public Works
540 Castro Street
City of Mountain View, California 94040
(415) 967-7211

PROJECT STATUS

The design phase is being completed, and most of the equipment has been ordered. Pacific Gas & Electric Company is presently designing a gas recovery system that will purify approximately 420 ft³/min of raw landfill gas from 450 to 700 Btu/stdft³. The raw gas will be pumped from 20 wells on the Mountain View landfill and will be purified by a molecular sieve cleansing system. After purification, the gas will be fed directly into the Pacific Gas & Electric Company transmission line.

NASHVILLE, TENNESSEE

PROJECT TYPE: Waterwall combustion

CAPACITY: 720 TPD

CAPITAL COST: \$16.5 million (1972), including complete steam distribution system

PRODUCT/MARKETS: Steam/Central heating and cooling loop

MAJOR EQUIPMENT MANUFACTURERS: Babcock & Wilcox, Inc.
Detroit Stoker Company
Carrier Corporation

CONSULTING ENGINEER: I. C. Thomasson Associates

METHOD OF FINANCING: 30-year revenue bonds

STARTUP DATE: July 1974

PROJECT CONTACT: Ben McDermott, Executive Vice President
Nashville Thermal Transfer Corporation
Nashville, Tennessee 37201
(615) 244-3150

PROJECT STATUS

The plant is presently operational. Nashville Thermal Transfer Corporation (NTTC) is a nonprofit public authority, created by the city but operated independently of the city. The project was initiated originally as a fossil-fuel-fired steam distribution system in conjunction with an ongoing urban renewal program. The use of solid waste as the primary fuel was added to the project after the steam market was assured.

The plant has been operating, but throughput has been limited because of the inability of air pollution control equipment (scrubbers) to control emissions and because of extensive tube deterioration in the solid waste-fire boilers. New air pollution control equipment, in the form of electrostatic precipitators, is being installed. Damaged waterwall tubes and superheaters are being replaced. Extensive changes in boilers are in progress in an attempt to improve boiler performance. The plant is meeting its obligations for steam and chilled water by burning fossil fuel at an operating deficit.

The city, which had previously paid only a nominal charge to Thermal for disposal services, recently agreed to pay \$1.5 million in annual dumping fees to help meet current operating deficits. NTTC has recently received \$8 million in additional funding to accomplish capital improvement, repay short-term financing, and meet bond reserve fund obligations. The Tennessee State Funding Board provided \$5.7 million, and the city has obtained agreements from local banks to provide the balance.

NEW HAVEN, CONNECTICUT

PROJECT TYPE: Waterwall combustion

CAPACITY: 1,800 TPD

CAPITAL COST: NA

PRODUCTS/MARKETS: Steam; ferrous metals/NA

PRIME CONTRACTOR: Not selected

METHOD OF FINANCING: Revenue bonds through Connecticut Resource Recovery Authority

STARTUP DATE: NA

PROJECT CONTACT: Richard P. Chase
Connecticut Resource Recovery Authority
60 Washington Street, Suite 1305
Hartford, Connecticut
(203) 549-6390

PROJECT STATUS

An RFP has been issued and four finalists have been selected. The finalists are Combustion Engineering, Wheelabrator-Frye, Combustion Equipment Associates, and Carrier Corporation.

Connecticut Resources Recovery Authority is contemplating expanding the New Haven facility to 2,600 TPD. The additional waste would be transported from the Hartford area. Markets for the steam produced are still being negotiated.

NEW ORLEANS, LOUISIANA

PROJECT TYPE: Materials recovery

CAPACITY: 650 TPD

CAPITAL COST: \$5.7 million (1975)

PRODUCTS/MARKETS: Paper: (No. 1 news) Johns-Mansville Co.
Ferrous: U.S. Steel (light); Southern Scrap Material Co. (heavy)
Aluminum: Reynolds Metals Co.
Glass: Underwood Glass Corp. (flint); Owens-Illinois Co. (mixed)

CONTRACTOR: Waste Management, Inc.

METHOD OF FINANCING: Waste Management, Inc.
Loan from National Center for Resource Recovery, Inc.

STARTUP DATE: First phase (shredding and landfilling) September 1976. Second phase (ferrous, aluminum, glass recovery) March 1977

PROJECT CONTACT: Frank Bernheisel
National Center for Resource Recovery, Inc.
1211 Connecticut Avenue, N.W.
Washington, D.C. 20036
(202) 223-6154

PROJECT STATUS

The city has given final approval to a contract with Waste Management to construct, own, and operate a facility that will recover glass, ferrous and nonferrous metals, and paper from the solid waste stream. The system was designed by the National Center for Resource Recovery, which will act as technical advisor to the city and will monitor the construction and operation of the facility. The building foundations have been constructed and the systems equipment ordered. The facility is expected to be completed by late 1976 and to commence operating shortly thereafter.

NORFOLK, VIRGINIA (U.S. NAVAL STATION)

PROJECT TYPE: Waterwall combustion

CAPACITY: 360 TPD

CAPITAL COST: \$2.2 million (1967)

PRODUCT/MARKET: Steam/Naval station

MAJOR EQUIPMENT MANUFACTURERS: Foster Wheeler Corp.
Detroit Stoker Co.

PRIME CONTRACTOR/CONSULTING ENGINEER: Metcalf & Eddy, Inc.

METHOD OF FINANCING: NA

STARTUP DATE: 1967

PROJECT CONTACT: William Osteen
Head, Utilities Dept.
Norfolk Naval Station
(804) 444-3091

PROJECT STATUS

The unit has been operational since 1967 and is currently producing 10 percent of the naval station's steam requirements. The plant normally operates one unit 24 hours per day, 5 days a week, processing 100 tons of garbage. Units are alternated each week. Steam production averages 40,000 lb/h. A Jeffrey shredder has recently been installed to process pilings and white goods. Air emissions are controlled by two electrostatic precipitators. Three recent tests of particulate emissions reported .021, .052, and .013 gr/DSCF (corrected to 12 percent CO₂), well within Federal standards of .08 gr/DSCF.

ONONDAGA COUNTY, NEW YORK

PROJECT TYPE: Waterwall combustion

CAPACITY: 1,000 TPD

CAPITAL COST: \$21 million (1978)

PRODUCT/MARKET: Steam/Heating and cooling loop

MAJOR EQUIPMENT MANUFACTURER: NA

PRIME CONTRACTOR: Carrier Corporation

METHOD OF FINANCING: Municipal bonds; bond anticipation notes; State grant

STARTUP DATE: NA

PROJECT CONTACT: Charles R. Stoffel
Federal Aid Representative
Onondaga County, New York
Box 23324
L'Enfant Plaza Station
Washington D.C. 20024
(202) 554-2494

PROJECT STATUS

Design study underway. Onondaga County owns and operates a midtown district heating and cooling plant that supplies steam and chilled water to various county and city buildings in Syracuse. A few blocks away is a district heating and cooling plant owned by Syracuse University that serves many campus buildings, several hospitals, and a housing project. In May 1974, the county and university entered into a contract with Carrier Corporation to conduct a feasibility study of the possibilities of converting the two plants to the use of municipal solid waste as a fuel.

To assist in the study, Carrier Corporation engaged the services of Roisson and Woese, Consulting Engineers; I. C. Thomasson & Associates, Consulting Engineers; and Edward Joe Company, Mechanical Contractors. The completed study recommended that the existing county steam plant be phased out and that a new steam plant using solid waste as a fuel be built adjacent to the existing university steam plant site. The facility would have the capacity to incinerate most of the 1,200 tons of solid waste produced by Onondaga County's half million residents each day and would recover energy from this waste in the form of steam. The existing university steam plant would be retained as a standby unit. The proposed plant will produce 270,000 lb/h of steam. A design study is being performed by the Carrier Corporation and is expected to be completed in 1976.

PALMER TOWNSHIP, PENNSYLVANIA

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: Estimated throughput: 150 TPD, Plant capacity: 500 TPD

CAPITAL COST: \$2.8 million (1976)

PRODUCTS/MARKETS: Densified RDF/Cement manufacturing facility

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTING ENGINEER: Elo and Rhodes, Inc.

METHOD OF FINANCING: \$2.1 million State funds; remainder from the township

STARTUP DATE: NA

PROJECT CONTACT: H. Robert Daws, Chairman
Board of Supervisors
Palmer Township Municipal Building
3245 Freemansburg Avenue
Easton, Pennsylvania 18042

PROJECT STATUS

Detailed working drawings have been completed, and a permit for the facility has been issued by the State Department of Natural Resources. The system includes shredding, magnetic separation, air classification, and pelletizing of the recovered organic fraction of the waste. The facility is estimated to cost \$2.8 million. The State awarded \$2.1 million in grant funds to the township in June 1976. E.P.A. withdrew their \$350,000 grant award made in June 1975 due to the township's lack of additional funds needed to move ahead in a reasonable time schedule. The township is currently negotiating with the county to cosponsor and help finance the remaining portion of the project. This may take another year, however.

PALOS VERDES, CALIFORNIA

PROJECT TYPE: Landfill gas recovery

CAPACITY: 1 MCF/day

CAPITAL COST: NA

PRODUCT/MARKET: Methane/Southern California Gas Company

MAJOR EQUIPMENT MANUFACTURER: Reserve Synthetic Fuels, Inc.

PRIME CONTRACTOR: Reserve Synthetic Fuels, Inc.

METHOD OF FINANCING: Reserve Synthetic Fuels, Inc.

STARTUP DATE: 1975

PROJECT CONTACTS: Robert Collins
President
Reserve Synthetic Fuels, Inc.
Newport Beach, California
(714) 645-4211

Ron Schwegler
Division Engineer
L. A. County Sanitation District
P. O. Box 4998
Whittier, California 90607
(213) 699-7411

PROJECT STATUS

The system is currently operational. Reserve Synthetic Fuels, Inc., formerly NRG NuFuel, has constructed and is operating a molecular sieve cleansing system that purifies to pipeline standards ($1,000 \text{ Btu/stdft}^3$) approximately $1,000$ to $1,500 \text{ ft}^3/\text{min}$ of raw landfill gas (500 Btu/stdft^3) that has been pumped from several wells on the Palos Verdes landfill. After purification, the gas is fed directly into a local Southern California Gas Company gas main.

POMPANO BEACH, FLORIDA

PROJECT TYPE: Methane recovery

CAPACITY: 50 to 100 TPD

CAPITAL COST: \$2.9 million (1976)

PRODUCTS/MARKET: Methane, nonpipeline quality (550 to 750 Btu/stdft^3)

MAJOR EQUIPMENT MANUFACTURER: Jacobs Engineering

PRIME CONTRACTOR/CONSULTING ENGINEER: Waste Management, Inc.

METHOD OF FINANCING: Grant from Energy Research and Development Administration

STARTUP DATE: Mid-1977

PROJECT CONTACT: Donald Walter
Office of Conservation
U.S. Energy Research and Development Administration
Washington, D.C. 20545
(202) 376-4889

PROJECT STATUS

The facility will be located on an existing privately owned and operated landfill with shredding capacity now serving an area around Pompano Beach, Florida. The process will involve shredding, magnetic separation, trommeling, and air classification prior to digestion. Funds now committed are allocated to the design and the construction of the facility. The facility will be operated by Waste Management, Inc., owner of the landfill involved.

The facility is intended to provide data regarding optimum operating parameters for methane production from a mixture of municipal waste and sewage sludge. Parameters examined will include temperature, residence time, ingredient mixtures, supplementary nutrients, and others. The initial mixture will include 95 percent solid waste with 5 percent sewage sludge. Gas produced is estimated to possess a heating value of from 550 to 750 Btu/stdft³ and initially will be used for process energy with the excess flared.

PORTLAND, OREGON

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: Two facilities (1,500 TPD each)

CAPITAL COST: \$18 million (1976)

PRODUCTS/MARKET: RDF; ferrous metals/Industry boiler

MAJOR EQUIPMENT MANUFACTURER: Heil Company

CONSULTING ENGINEER: NA

METHOD OF FINANCING: State pollution control bonds are being considered

STARTUP DATE: Phase I: mid-1978; Phase II: 1981

PROJECT CONTACT: Chuck Kemper, Manager
Metropolitan Service District
527 S.W. Hall
Portland, Oregon 97201
(503) 222-3671

PROJECT STATUS

The city issued an RFP in October 1974 for the construction of two 1,500-TPD facilities. The first phase will consist of one 1,500-TPD facility and transfer station. Each facility will consist of two 60-TPH shredders, air classification systems, and magnetic separation equipment. If financing can be arranged, the first phase should be online by mid-1978. A contract for the purchase of the fuel fraction is being negotiated with Publisher's Paper Co., which will construct boilers near the facility site to accept the RDF.

PORTSMOUTH, VIRGINIA (NORFOLK NAVAL SHIPYARD)

PROJECT TYPE: Waterwall combustion

CAPACITY: 160 TPD

CAPITAL COST: NA

PRODUCT/MARKETS: Steam/Base & ship load

MAJOR EQUIPMENT MANUFACTURER: Detroit Stoker Co.

PRIME CONTRACTOR/CONSULTING ENGINEER: NA

METHOD OF FINANCING: NA

STARTUP DATE: Late 1976

PROJECT CONTACT: Mr. Joel Premack
NAVFAC ENCOM
Washington, D.C.
(202) 325-8176

PROJECT STATUS

The unit is currently undergoing testing. The plant is located at the shipyard in Portsmouth and will supply steam to yard facilities and ships undergoing repair. The unit consists of two 80-TPD furnaces that are expected

to handle a total of 110 to 120 TPD of solid waste. The units are designed to produce 30,000 lb/h of 200 PSIG steam per boiler. Particulate emissions will be controlled by means of electrostatic precipitators.

RIVERSIDE, CALIFORNIA

PROJECT TYPE: Pyrolysis (gaseous fuel)

CAPACITY: 50 TPD

CAPITAL COST: NA

PRODUCTS/MARKET: Electricity/Residential grid

MAJOR EQUIPMENT MANUFACTURER: Pyrolysis Systems Inc.

PRIME CONTRACTOR: Pyrolysis Systems Inc.

METHOD OF FINANCING: Private

STARTUP DATE: March 1977

PROJECT CONTACT: George M. Hubbard
Public Service Director
City of Riverside
8095 Lincoln
Riverside, California 92505
(714) 787-7254

PROJECT STATUS

The city of Riverside has signed a contract with Pyrolysis Systems Inc. The city will provide the company with a site and with 50 TPD of solid waste. The company will build and operate the "pyrotec" pyrolysis unit as a demonstration/prototype. When the system proves economically and technically feasible at a larger scale, the city will solicit bids for the construction of a 300-TPD pyrolysis system. The pyrolysis plant will generate gas that will power a turbogenerator.

ST. LOUIS, MISSOURI (DEMONSTRATION)

PROJECT TYPE: Refuse-derived fuel (RDF)

CAPACITY: 45 TPH

CAPITAL COST: \$2.8 million (1971)

PRODUCTS/MARKETS: RDF/Union Electric Company (UE)
Ferrous metals/Granite City Steel Corporation

CONSULTING ENGINEERS: Horner & Shifrin, Inc.

METHOD OF FINANCING: EPA grant, city, and UE funding

STARTUP DATE: April 1972

EPA PROJECT OFFICER: Robert Holloway, (202) 755-9140

PROJECT CONTACT: James Shea
Refuse Commissioner
City of St. Louis
4100 S. First Street
St. Louis, Missouri 63118
(314) 353-8550

PROJECT STATUS

The plant is no longer operating continuously.

EPA, the city of St. Louis, and Union Electric Company (UE) jointly funded a 300-TPD RDF project to demonstrate the economic and technical feasibility of firing RDF as a supplement to pulverized coal in existing utility-class steam-electric boilers. The project commenced operations in April 1972.

EPA contracted with Midwest Research Institute to evaluate the entire project. Evaluations were initiated in fall 1973 and are scheduled to be completed in winter 1976. Test reports are available from EPA.

Based on the success of the project to date, UE has decided to implement a \$70 million 6,000-TPD project that will handle waste from the entire St. Louis metropolitan area.

ST. LOUIS, MISSOURI (UNION ELECTRIC COMPANY)

PROJECT TYPE: Refuse-derived fuel (RDF) with materials recovery

CAPACITY: 6,000 TPD

CAPITAL COST: \$70 million (1975)

PRODUCTS/MARKETS: RDF/Union Electric Company (UE)
Ferrous metals/selected but not announced
Nonferrous metals/not selected
Glass-rich residue/not selected

CONSULTING ENGINEERS: Horner & Shifrin, Inc.

METHOD OF FINANCING: Pollution control revenue bonds

STARTUP DATE: NA

PROJECT CONTACT: David Klumb
Manager, Solid Waste Utilization Systems
Union Electric Company
P.O. Box 149
St. Louis, Missouri 63166
(314) 241-9667

PROJECT STATUS

Union Electric Company (UE) has been participating since 1969 with the city of St. Louis and EPA in a 300-TPD demonstration project to assess the feasibility of firing prepared waste as supplementary fuel into an existing coal-fired utility boiler.

Based on the success of the demonstration project, UE announced in February 1974 plans to implement a \$70 million 6,000-TPD system. UE will accept raw waste at transfer stations that it will design, construct, own, and operate.

The raw waste will be transported in enclosed containers by rail to its Labadie power plant. UE will design, construct, own, and operate the waste processing facilities at the power plant that will produce RDF and recover marketable materials.

In addition to ferrous metals, aluminum, mixed nonferrous metals, and glassy residue will be produced if technically and economically feasible.

Engineering design is underway and most equipment has been ordered. However, equipment fabrication has been temporarily halted pending the acquisition of the fourth transfer station site.

SAN DIEGO COUNTY, CALIFORNIA

PROJECT TYPE: Pyrolysis (liquid fuel)

CAPACITY: 8 TPH

CAPITAL COST: \$8.6 million, construction only (1976)

PRODUCTS/MARKETS: Liquid fuel/San Diego Gas & Electric Company
Ferrous metals, aluminum, mixed-color cullet/Secondary materials industries

PRIME CONTRACTOR: Occidental Research Corporation (formerly Garrett Research & Development Corporation)

CONSULTING ENGINEERS: Ehrhart Division of Procon, Inc. (a subsidiary of Universal Oil Products, Inc.)

METHOD OF FINANCING: EPA demonstration grant: \$4.2 million; County: \$2.0 million; Occidental: \$7.4 million

STARTUP DATE: May 1977

EPA PROJECT OFFICER: Yvonne Garbe, (202) 755-9140

PROJECT CONTACT: John Burke
Department of Sanitation & Flood Control
5555 Overland Avenue
San Diego, California
(714) 565-5363

PROJECT STATUS

Now under construction, this 200-TPD pyrolysis plant will be built in El Cajon. The system involves shredding and air classification to produce a fluffy material that is pyrolyzed to produce a liquid fuel; magnetic separation of ferrous metals; screening and froth flotation to recover glass cullet; and a magnet to recover aluminum.

The liquid fuel product will be used by the San Diego Gas and Electric Company as a supplement to No. 6 fuel in a steam-electric power plant. Markets for ferrous metals, glass, and aluminum are being developed. Products not sold will be stockpiled for future use in testing programs.

SAUGUS, MASSACHUSETTS

PROJECT TYPE: Waterwall combustion

CAPACITY: 1,200 TPD

CAPITAL COST: \$35 million (1975)

PRODUCTS/MARKET: Steam; ferrous metals/Industry

MAJOR EQUIPMENT MANUFACTURER: Wheelabrator-Frye, Inc.

PRIME CONTRACTOR/CONSULTING ENGINEER: Refuse Energy Systems Company

METHOD OF FINANCING: Industrial revenue bonds

STARTUP DATE: April 1, 1976

PROJECT CONTACT: W. G. Stephens
Wheelabrator-Frye, Inc.
(201) 766-7700

PROJECT STATUS

The project is undergoing shakedown and is operational as of April 1976. The Saugus facility is owned and operated by the Refuse Energy Systems Company (RESCO), a joint venture of De Matteo Construction Company and Wheelabrator-Frye.

Under the terms of a 20-year contract, the plant handles refuse from 16 communities north of Boston at an initial fee of \$13 per ton. The steam generated is being sold to the General Electric Company plant at Lynn, Massachusetts. Air emissions are controlled by electrostatic precipitators. The Saugus facility is the first waterwall incinerator in this country to generate high-temperature (825° F) steam using solid waste as a fuel. Tube cleaning is accomplished through hammer action.

SEATTLE, WASHINGTON

PROJECT TYPE: Pyrolysis (gas byproduct)

CAPACITY: 1,500 TPD

CAPITAL COST: \$110 million

PRODUCTS/MARKET: Ammonia; ferrous metals

MAJOR EQUIPMENT MANUFACTURER: Union Carbide Company

METHOD OF FINANCING: \$30 million, private; \$80 million, city revenue bonds

STARTUP DATE: 1980

PROJECT CONTACT: Catherine Shreve
Acting Project Director
Solid Waste to Ammonia project
Seattle Municipal Bldg.
Seattle, Washington 98104
(206) 625-2551

PROJECT STATUS

The system has been selected. Seattle will purchase at a cost of \$80 million a "Purox" pyrolysis system to be operated by the Union Carbide Company for a period of 20 years. The gaseous products of the pyrolysis system will be processed by a separate facility into ammonia gas. The gas processing facility will be built at a cost of \$30

million and owned and operated by the Coyne Chemical Company. The system will be capable of processing all of the city's municipal waste, with some excess capability to handle future participation by surrounding counties. The city has selected Bechtel, Inc., as the A&E firm that will do siting and engineering design. The Energy Research and Development Administration (ERDA) is currently negotiating a \$1 million contract with the Union Carbide Company to build a pilot gas cleanup plant and a \$500,000 contract with the city for feasibility and design work. Final city council authorization is scheduled for April 1977, pending a successful demonstration of the gas cleanup system, and a bond issue is scheduled for mid-1977.

SILOAM SPRINGS, ARKANSAS

PROJECT TYPE: Modular combustion

CAPACITY: 19 TPD (design)

CAPITAL COST: \$377,000 (1974)

PRODUCT/MARKET: Steam (125 PSIG at 380° F)/Neighboring food canning plant

MAJOR EQUIPMENT MANUFACTURER: Consumat Inc.

PRIME CONTRACTOR/CONSULTING ENGINEER: NA

METHOD OF FINANCING: Municipal funds; no interest

STARTUP DATE: Incinerators, June 1975; Steam production, September 1975

PROJECT CONTACT: Mayor Robert Knight
City of Siloam Springs, Arkansas
(501) 524-5236

PROJECT STATUS

This facility has been successfully burning municipal solid waste and producing steam since September 1975. The unit consists of two Consumat incinerators (9.5 tons per 10-hour day each) with two attached waste heat boilers and two ram-charged hoppers fed by a front-end loader vehicle. The entire operation is batch fed, broken into three operating cycles per 24-hour day: 10 hours of charging solid waste, 12 hours of burndown, and 2 hours of cleanout (24-hour a day operation would require an automatic ash removal system).

Steam is produced during the 10 hours of charging at a rate of 5,000 lb/h per unit. Volume and weight reduction are 95 percent and 67 percent, respectively. Air emissions show a particulate discharge of 0.03 gr/DSCF, corrected to 12 percent CO₂. The system requires auxiliary fuel in the form of natural gas. Consumption during 4 days of testing averaged 440 ft³ of gas per ton of waste burned. This constitutes a fuel operating expense of 40 cents a ton based on 0.092 cents a therm (100,000 Btu).

Waste charged over 4 days in September averaged 14 TPD, which is below the design capacity of 19 TPD. Costs were based on a limited number of operating months. Total capital and operating cost per ton, including the steam revenue, was \$12.67. This is based on the current throughput of 16 TPD, 280 days a year, and a minimum yearly revenue of \$20,000, as specified in the contract between the city and the canning industry. With more operating experience, more available solid waste, and a foreseeable higher revenue from increased steam demands, it has been estimated that costs could be reduced to \$7 per ton.

Modular combustion units (small incinerators) using municipal solid waste as fuel and employing heat recovery are also in operation at Blytheville, Arkansas, and Groveton, New Hampshire.

SMITHTOWN, NEW YORK

PROJECT TYPE: Materials recovery

CAPACITY: 1,000 TPD

CAPITAL COST: \$5.4 million (1976)

PRODUCTS/MARKET: Corrugated and newspaper; ferrous and nonferrous metals/Secondary materials industries

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTING ENGINEER: Lawrence L. Smith Assoc.

METHOD OF FINANCING: 50% State funding; 50% NA

STARTUP DATE: May 1977

PROJECT CONTACT: Donal Devine, Town Engineer
P.O. Box 575
Smithtown, New York 11787
(516) 265-2900

PROJECT STATUS

Design for this system is complete and construction is 50 percent completed. The facility will be completed by April 1977. Markets have been established for ferrous and nonferrous metals, paper, and rags. Solid waste will be hand sorted, ferrous metals extracted magnetically, and the residue baled and then landfilled.

SOUTH CHARLESTON, WEST VIRGINIA

PROJECT TYPE: Pyrolysis (gaseous product)

CAPACITY: 200 TPD

CAPITAL COST: NA

PRODUCTS/MARKET: 300 Btu/SCF gas; ferrous metals; aggregate/NA

MAJOR EQUIPMENT MANUFACTURER: Union Carbide Corporation

PRIME CONTRACTOR/CONSULTING ENGINEER: Union Carbide Corporation

METHOD OF FINANCING: Union Carbide Corporation

STARTUP DATE: Mid-1974

PROJECT CONTACT: Thomas Donnegan
Union Carbide Corporation
270 Park Avenue
New York, New York 10017
(212) 551-4267

PROJECT STATUS

The system, being marketed under the trade name PUROX, is an oxygen-based process that converts either raw or shredded municipal refuse into fuel gas and a sterile residue. Refuse is fed into the top of a vertical shaft furnace and oxygen is injected into the bottom. The oxygen reacts with char formed from the refuse, generating a high temperature (3,000° F) that melts and fuses metal and glass. The molten metal and glass are quenched with water to form a hard granular material suitable for aggregate.

The hot gases formed by the reaction flow upward, preheating the descending refuse and pyrolyzing the refuse as the gas is circled. The resulting gas contains a heating value of approximately 300 Btu/ft³ and is relatively free of sulfur compounds and nitrogen oxides.

The pilot plant commenced operation in mid-1974 and is being used to determine scaleup parameters and to verify the economies of pyrolysis technology. The initial plant was modified to accept shredded solid waste, removing the ferrous fraction before pyrolyzing. The combined firing of solid waste and sewage sludge is planned for the future.

SUN VALLEY, CALIFORNIA

PROJECT TYPE: Landfill gas recovery

CAPACITY: 2.8 MCF per day

CAPITAL COST: \$1.25 million

PRODUCT/MARKET: Methane/Los Angeles Department of Water and Power

MAJOR EQUIPMENT MANUFACTURER: NA

PRIME CONTRACTOR: Los Angeles Dept. of Water and Power
Los Angeles Bureau of Sanitation
Department of Public Works

METHOD OF FINANCING: NA

STARTUP DATE: Spring 1978

PROJECT CONTACTS: Michael Miller
Bureau of Sanitation
Department of Public Works
City of Los Angeles
Room 1410, City Hall, East
Los Angeles, California 90012

Milt Bracey
Department of Water and Power
City of Los Angeles
Room 1148
111 North Hope Street
Los Angeles, California 90051
(213) 481-6519

PROJECT STATUS

The system is now in the design phase. The Los Angeles Department of Water and Power and the Bureau of Sanitation will construct and operate a gas recovery system that will provide 2,000 ft³ min of raw landfill gas (500 Btu/stdft³) that will be pumped from wells on the Sheldon Arleta landfill. The gas will be supplied to the Department of Water and Power and will be utilized as supplemental and startup boiler fuel.

WESTCHESTER COUNTY, NEW YORK

PROJECT TYPES: Two projects planned:
1. Pyrolysis
2. Undetermined

CAPACITY: 2,300 TPD

CAPITAL COST: NA

PRODUCTS/MARKETS: Gas or steam/Heating and cooling

MAJOR EQUIPMENT MANUFACTURER: NA

CONSULTING ENGINEER: Malcolm Pirnie, Inc.

METHOD OF FINANCING: \$105.7 million bonds authorized; \$44.5 million requested from State

STARTUP DATE: First plant, 1980; Second plant, undetermined

PROJECT CONTACT: Robert W. Huntington,
Commissioner of Public Works
County Office Bldg.
White Plains, New York
(914) 682-2003

PROJECT STATUS

The county plan calls for the construction of two facilities. The first will be constructed at the county's Grasslands Reservation for which the county is considering a pyrolysis system. Either gas or steam from this facility will provide heating and cooling for a hospital, medical college, health institute, jail, and nursing home, as well as potential commercial accounts. Most of these markets are connected to a central loop but also have self-contained heating and cooling capacity.

A second plant will be constructed at a site in the southern part of the county to be determined at a later date. Although the funding has been authorized by the county board and an application for State funds is pending, the exact form of the financing has not yet been determined.

WILMINGTON, DELAWARE

PROJECT TYPE: Refuse-derived fuel (RDF), composting, sewage sludge recycling, materials recovery, and pyrolysis

CAPACITY: 500 TPD

CAPITAL COST: NA

PRODUCTS/MARKETS: RDF/Delmarva Power and Light Company
Compost/Not selected
Ferrous metals/Not selected
Aluminum/Not selected
Mixed nonferrous/Not selected
Glass/Not selected

CONTRACTOR: Not selected

METHOD OF FINANCING: EPA; State general obligation bonds

STARTUP DATE: Early 1980

EPA PROJECT OFFICER: Robert Holloway, (202) 755-9140

PROJECT CONTACT: Pasquale S. Canzano
Department of Natural Resources and Environmental Control
State of Delaware
Dover, Delaware 19901
(302) 678-4781

PROJECT STATUS

EPA awarded a \$9 million grant to the State of Delaware in 1972 to demonstrate a total recycling system. The 500-TPD plant is estimated to cost between \$20 million and \$30 million. The plant will accept municipal solid waste, digested sewage sludge, and selected light industrial waste.

The State will enter into a full service contract with a single source to design, construct, and operate the facilities. The RFP has been developed and was advertised in December 1975.

The RDF will be fired with oil by Delmarva Power and Light Company in a 164-MW Combustion Engineering tangentially fired boiler. The boiler was designed to fire pulverized coal and is equipped with an electrostatic precipitator to control particulate emissions.

Resource Recovery Activity Reports—State Programs

STATE OF CALIFORNIA

PROJECT CONTACT: Albert A. Marino, Executive Director
California State Solid Waste Management Board
Rm. 1335, Resources Building
1416 9th Street
Sacramento, California 95814
(916) 322-3330

PROJECT TYPE: Development of State plan

CAPITAL COST: NA

METHOD OF FINANCING: NA

PROJECT STATUS

In 1972, the California State Legislature enacted the Solid Waste Management and Resource Recovery Act, which established the Solid Waste Management Board and required all counties to adopt solid waste management plans to be approved by the State board, placing priority upon resource recovery.

In implementing this priority on resource recovery, the act mandates the Solid Waste Management Board to develop a State Resource Recovery Plan considering the following elements:

- A State-directed R&D program
- A demonstration program for resource recovery
- Changes in product characteristics to encourage source reduction
- The use of State procurement practices to induce a market demand
- Incentives, including State grants, loans, and other assistance, along with disincentives
- Effects of existing public policies
- Disposal taxes on consumer goods
- State pilot resource recovery projects

To fulfill this mandate, the State board requested its advisory council on resource recovery to prepare a draft State resource recovery plan. This plan has been completed and has been presented to the public at a series of public hearings. As a consequence, the State Solid Waste Management Board adopted a policy on resource recovery and sought additional implementing legislation.

In January 1976, legislation was passed authorizing \$200 million in tax-exempt bonds for the construction of resource recovery facilities. The State is now developing review criteria for this program. In addition, studies are underway for the construction of a resource recovery facility in southern California and a \$2.3 million solid waste management plan for the Bay area. (\$200,000 of these funds have been authorized for Humboldt County implementation.) Another study is underway to evaluate the feasibility of using solid waste to supply heating and cooling either to State buildings in the city of Sacramento or to the University of California, Davis Campus. There is also a study on how to recover and utilize rice straw. A paper recycling project at State buildings is producing a \$2,500 per month profit.

See also project descriptions for Palos Verdes, Mountain View, Riverside, San Diego County, and Sun Valley.

STATE OF CONNECTICUT

PROJECT CONTACT: Mr. Joseph L. Boren, Director
Solid Waste Management Programs
Department of Environmental Protection
State of Connecticut
State Office Building, Room 248
Hartford, Connecticut 06115
(203) 566-3672

PROJECT TYPE: Operation of State authority

CAPITAL COST: NA

METHOD OF FINANCING: Revenue bonds

CONTRACTORS: Bridgeport: Occidental Research Corporation; Combustion Equipment Associates
New Haven: Undecided

PROJECT STATUS

As a result of a comprehensive State plan developed by the Connecticut Department of Environmental Protection, the State legislature created the Connecticut Resources Recovery Authority (CRRA). The authority is carrying out implementation of the plan, which calls for the construction by 1985 of 10 resource recovery facilities that will process 84 percent of the State's waste. CRRA has been given \$250 million bonding authority for facility construction. During formulation of the plan, EPA funded a study that gave the State an independent Commentary on the proposed legislation, gave a framework for evaluation of proposed projects, and made recommendations for the organization and management of the authority as well as on aspects of financing and system incentives.

The authority has designated that Occidental Research Corporation and Combustion Equipment Associates will contract to build a resource recovery plant in Bridgeport. The Bridgeport contract was signed in March 1976. Currently CRRA is analyzing proposals for the New Haven facility, which would also process evaluating waste from the Hartford area. Unique features of the Connecticut plan include

- *Voluntary Participation.* Communities are not required to utilize the services of the CRRA facilities, but instead may decide to do so on an economical basis.
- *Rate Setting.* There is no regulation of the rates charged to the communities. However, since the system is voluntary, CRRA is forced to be competitive with other means of disposal.
- *Private Sector Involvement.* Since CRRA is limited to 30 employees, the private sector will be utilized for design, construction, and operation of facilities.

See also project descriptions for Bridgeport and New Haven.

STATE OF FLORIDA

PROJECT CONTACT: Franchot Buhler
Resource Recovery Council
2562 Executive Center Circle, E.
Tallahassee, Florida 32301
(904) 488-0140

PROJECT TYPE: Development of State plan

METHOD OF FINANCING: NA

PROJECT STATUS

Florida has enacted legislation creating a Resource Recovery Council, which will recommend resource recovery areas and approve the State plan that the Department of Environmental Regulation is responsible for developing.

To implement the adopted program, the law states that specific powers of the Department of Environmental Regulation shall be to

- Provide technical assistance to counties and municipalities.
- Charge user fees.
- Acquire personal or real property.
- Acquire, construct, and operate resource recovery facilities.

Furthermore, the law states that by July 1, 1978, all counties and municipalities shall adopt, either solely or in cooperation with other counties and municipalities, a local resource recovery and management program that shall be approved by the department and shall implement the provisions of the State program.

Consultants have completed and submitted three county-funded studies and are waiting approval.

The Resource Recovery Council has funded and carried out the following four studies submitted by consultants:

- Statewide energy feasibility study identifying current waste generation in areas of urban concentration and primary energy markets for use of waste-based fuels, and assessing the technology available to provide the fuel form specified by the energy user
- Four-county regional (Tampa Bay area) resource recovery feasibility study
- Institutional analysis of existing interlocal agreements and special acts of the legislature
- Financial and legal analysis of Dade County project, using this county's experience as a source of technical assistance information for other areas of the State

The Resource Recovery Council has made the following in-house studies:

- Survey of State transfer stations
- Comparative analysis of waste composition since 1970
- Test on use of cone and quartering technique in composition analysis and materials balance in conjunction with St. Petersburg, Pinellas County, and the Bureau of Mines

Also see project descriptions of Dade County, Miami, and Pompano Beach.

STATE OF ILLINOIS

PROJECT CONTACT: Jack Moore
Division of Land Pollution Control
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706
(217) 782-6760

PROJECT TYPE: Solid waste grant program

CAPITAL COST: \$6 million grant funding

METHOD OF FINANCING: State bonding authority

PROJECT STATUS

The State Solid Waste Office is operating a grant program of \$6 million for solid waste planning and resource recovery demonstrations. The State will produce a policy planning document that will define the State's role in resource recovery. The policy will then be implemented in 1976. In the interim, a grant has been given to the city of Springfield for a design study of a supplementary fuel system for the City Water, Light and Power Company, a municipally owned utility.

The grant is in the amount of \$4.9 million toward a total project cost of \$6.5 million. An RFP was advertised in July 1975, and the firm of Henningson, Durham, & Richardson was selected as the engineering consultant for the project. The facility study is scheduled to be completed by November 1976, at which time the city will make a decision whether to proceed with the design phase. The city is the recipient of a grant from EPA to assist in implementation work for the facility.

Also see project descriptions (two) of Chicago.

STATE OF MARYLAND

EPA PROJECT OFFICER: Yvonne Garbe, (202) 755-9140

PROJECT CONTACT: Cliff Willey
Chief of Solid Waste Services
Maryland Environmental Services
Tawes State Office Building
Annapolis, Maryland 21401
(301) 267-5666

PROJECT TYPE: State grant and loan program

METHOD OF FINANCING: State appropriation

PROJECT STATUS

The Maryland Environmental Services (MES) can provide both grants and loans for resource recovery facilities. Four million dollars of the matching funds for EPA's \$16 million demonstration in Baltimore was provided by MES.

In addition, MES is funding, in a joint venture with Baltimore County, the Baltimore County Solid Waste Disposal System and Reclamation Project. Phase I of this project will consist of shredding, followed by magnetic separation. The ferrous fraction recovered will be sold to the detinning market. The remainder is to be landfilled. MES is spending \$300,000 on market and product development. Phase II of the project will consist of recovery of the fiber (either as fuel or fiberboard), glass, and other heavy fraction as their markets develop.

An additional \$50,000 in State funding has been dedicated for tire baling and fish reef construction at Ocean City, and \$180,000 for a separate collection program in Montgomery County for 1974. A \$5 million grant/loan program was enacted that permits the State to fund 20 percent of a resource recovery activity, some of which has been obligated to date.

Also see project descriptions of Baltimore, Baltimore County, and Montgomery County.

COMMONWEALTH OF MASSACHUSETTS

EPA PROJECT OFFICER: Richard Hopper, (202) 755-9150

PROJECT CONTACT: Alden Cousins, Director
Bureau of Solid Waste Disposal
Massachusetts Department of Public Works
100 Nashua Street
Boston, Massachusetts 02114
(617) 727-4293

PROJECT TYPE: Waterwall incineration of solid waste to produce electricity for Massachusetts Electric Company and to recover ferrous metals from incinerator residue

CAPACITY: 3,000 TPD

CAPITAL COST: \$98 million (1978)

METHOD OF FINANCING: Industrial revenue bonds (local Industrial Development Authority); private capital

CONTRACTOR: UOP, Inc.

CONSULTANT: Mitre Corporation

STARTUP DATE: 1980

PROJECT STATUS

The Commonwealth of Massachusetts is implementing a statewide resource recovery plan. The plan features a system of privately financed, privately owned, local resource recovery facilities. The first facility is scheduled to be constructed in Havenhill and service the northeast section of the State.

In October 1975, UOP was selected to design and construct a WWI facility to produce steam that would be converted to electricity and sold to the Massachusetts Electric Company. Ferrous metals will be recovered from the incinerator residues. Fifty-three communities, including six southern New Hampshire communities, will provide the solid waste and contract negotiations are underway with these communities. The facility is expected to be operational by 1980. The State has been awarded a grant from EPA to assist in the implementation.

Also see project descriptions of Braintree, East Bridgewater, Salem, and Saugus.

STATE OF MICHIGAN

PROJECT CONTACT: Fred Kellow, Chief
Solid Waste Management Division
Environmental Protection Branch
Department of Natural Resources
3000 Logan Street
Lansing, Michigan 48914
(517) 373-6620

PROJECT TYPE: Development of State plan

METHOD OF FINANCING: NA

PROJECT STATUS

Both the State house and senate in 1974 unanimously passed legislation to establish a State program for resource recovery. The Governor signed the legislation and it became effective January 1, 1975. The legislation primarily does three things: (1) It mandates the State Department of Natural Resources to develop a State resource recovery plan by January 1978 and then to update the plan yearly; (2) it establishes a State Resource Recovery Advisory Commission and requires it to formally adopt the State plan; and (3) it gives the department authority to construct and operate resource recovery facilities, issue revenue bonds, contract for services, charge user fees, and make loans to local government. Problems in funding have delayed the initiation of this program.

Also see project description of Detroit.

STATE OF MINNESOTA

PROJECT CONTACT: Robert Silvagni
Minnesota Pollution Control Agency
Division of Solid Waste
1935 West County Road, B2
Roseville, Minnesota 55113
(612) 296-7315

PROJECT TYPE: State grant program

CAPITAL COST: \$1.35 million in 50% matching grant funds

METHOD OF FINANCING: State appropriation

PROJECT STATUS

A \$3.5 million resource recovery/source reduction grant program is being implemented by the Minnesota Pollution Control Agency. To be eligible for State assistance, a program or project must be consistent with all State-approved county and regional solid waste management plans of affected counties and must comply with all applicable local, State, and Federal regulations. Grant-in-aid payments made by the State cannot exceed 50 percent of the total cost of the program or project funded. Resource recovery grants to date have been for the purpose of conducting planning and feasibility studies and programs to encourage conservation and the reduction of environmental impacts from solid waste.

To date 20 grants have been awarded to communities. These consist of the implementation of a resource recovery facility, the implementation of a source separation project, and 28 feasibility studies.

Also see project description of Minneapolis-St. Paul.

STATE OF MONTANA

PROJECT CONTACT: Terry Carmody, Chief
Solid Waste Management Bureau
Montana Department of Health and Environmental Science
Helena, Montana
(406) 449-2821

PROJECT TYPE: Resource recovery study

CONSULTING ENGINEER: Henningson, Durham & Richardson

METHOD OF FINANCING: NA

PROJECT STATUS

The State has commissioned a \$200,000 resource recovery study to include a survey of the types and quantities of solid waste in Montana, a description of the technology available to recycle the waste, potential markets, and programs for different areas within the state. The study will be completed by the fall of 1976. Funds will be requested for the 1977 legislature to implement the recommendations.

STATE OF NEW YORK

PROJECT CONTACT: David Mafrici, Director
Bureau of Resource Recovery

Division of Solid Waste Management
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12201
(518) 457-3199

PROJECT TYPE: State grant program

CAPITAL COST: \$175 million for solid waste disposal and resource recovery grants to local government

METHOD OF FINANCING: General obligation bonds

PROJECT STATUS

New York State voters have approved a \$1.1 billion Environmental Bond that includes \$175 million for solid waste disposal and resource recovery facilities. The regulations provide up to 25 percent State funding for disposal projects and up to 50 percent for resource recovery projects, thus increasing the incentive for resource recovery. In addition, the regulations provide that to be eligible for State assistance, a project must be consistent with a comprehensive solid waste management plan. Comprehensive plans must (1) assure that all municipalities within a region will be served by a solid waste recovery and management system; (2) provide for intermunicipal cooperation; (3) define solid waste collection service areas and the type of service to be provided; (4) utilize modern technology to best meet local needs and optimize opportunities for resource recovery; and (5) provide for phased implementation of proposed systems to meet short-range and long-range needs. To date, \$171 million has been set aside for 21 specific resource recovery projects. These include pyrolysis, dry refuse-derived fuel (both for supplemental and 100 percent refuse-fired steam generation), and materials recovery systems. Actual grant awards will be made to the specific communities upon State approval of the contractor's bid price for a facility.

Also see project descriptions of Albany, Chemung County, Hempstead, Mount Vernon, Onondaga County, Smithtown, and Westchester County.

STATE OF NORTH CAROLINA

PROJECT CONTACT: Sidney H. Usry, Head
Solid Waste and Vector Control Branch
Department of Human Resources
P.O. Box 2091
Raleigh, North Carolina 27602
(919) 829-2178

PROJECT TYPE: Resource recovery facility tax incentive

PROJECT STATUS

The State has thus far concentrated its efforts at encouraging private industry to invest in facilities that will recover commercial and industrial wastes. To that end, legislation was enacted in January 1976 that empowered

the Department of Human Resources to certify facilities constructed for the purpose of recovering resources. The facilities that qualify are granted a tax-exempt status from county real estate taxes and a 60-month writeoff for State tax purposes. The certification process takes effect on June 2, 1976, and will be retroactive to January 1976.

STATE OF OHIO

PROJECT CONTACT: Dave Sharp
Office of Land Pollution Control
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216
(614) 466-8934

PROJECT TYPE: Development of State plans

CONSULTANT: Stanley Consultants Inc.

METHOD OF FINANCING: NA

PROJECT STATUS

The Office of Land Pollution Control is currently embarked on a \$700,000 study to develop a statewide plan for resource recovery. Phase I of this study should be completed by October 1976, with phases II and III to be completed a year later.

The agency has developed an in-house action plan and has formed a State advisory group to provide ongoing guidance for its implementation. Within this action plan, it is recommended that the State design, construct, and operate resource recovery facilities under the existing powers of the Ohio Water Development Authority to make loans and grants to governmental agencies for the acquisition or construction of solid waste projects (Section 6123, Ohio Revised Code). A bond referendum seeking an additional appropriation for such purposes was approved by the legislature but was rejected by the voters.

Also see project descriptions of Akron, Franklin, and Montgomery County (Dayton).

COMMONWEALTH OF PENNSYLVANIA

PROJECT CONTACT: Tim Bratton, Chief, Resource Recovery Section
Division of Solid Waste Management
Department of Environmental Resources
8th Floor Fulton Building
P.O. Box 2063
Harrisburg, Pennsylvania 17120
(717) 787-7381

PROJECT TYPE: State loan program

METHOD OF FINANCING: NA

PROJECT STATUS

In 1974, the Pennsylvania Legislature enacted the Pennsylvania Solid Waste Resource Recovery Development Act creating a State loan program for local resource recovery projects. Requirements of the act are that in reviewing applications for loans, the Department of Environmental Resources shall consider (1) the amounts of polluting substances treated and/or eliminated; (2) the overall environmental benefits to be accrued as a result of the projects; (3) the amount of populations served; and (4) the extent of resource recovery to be included. Furthermore, the law requires that no loan shall be made to any local government that is not a part of a department-approved local solid waste management plan. Twenty million dollars was authorized for the purposes of the act. At present, the Department of Environmental Resources is drafting rules and regulations to implement the loan program.

Also see project descriptions of Altoona and Palmer Township.

STATE OF RHODE ISLAND

EPA PROJECT OFFICER: Thomas Whalen (202) 755-9150

PROJECT CONTACT: Louis David, Executive Director
Rhode Island Solid Waste Management Corporation
29 Pike St.
Providence, Rhode Island 02907
(401) 831-4440

PROJECT TYPE: Statewide implementation plan

CONSULTING ENGINEERS: CE Maguire, Inc.

METHOD OF FINANCING: Undetermined

PROJECT STATUS

Based on findings of the Rhode Island Solid Waste Management Plan, the Rhode Island Legislature established, effective September 1974, the Rhode Island Solid Waste Management Corporation, with the ultimate objective of maximizing resource recovery, recycling, and reuse throughout the State. The corporation is composed of seven commissioners: four appointed by the Governor, two by the speaker of the house, and one by the senate majority leader. In all their activities, the corporation is assisted by an 11-member Citizens Advisory Board, appointed by the Governor.

The Rhode Island Solid Waste Management Corporation has the power to

- Plan and implement programs, systems, and facilities.
- Receive and process wastes, make payment for goods and services, acquire real property, buildings, and equipment.

- Enter into any form of contract necessary to carry out its functions.
- Raise revenues through the sale of bonds, through fees charged for use of its facilities or by the sale of recovered energy and materials.
- In addition, cities that cannot dispose of their solid waste within their own boundaries must utilize a State-licensed system or facility made available by the corporation.

The corporation has contracted with three cities for disposal. They, in turn, negotiate with the landfill owner. The corporation is charging a 30 cents per capita surcharge, which is used to help finance the activities of the corporation.

The corporation has selected CE Maguire, Inc., to assist in developing their implementation plan and their RFP. The State is the recipient of a grant from EPA to assist in the implementation process.

STATE OF TENNESSEE

PROJECT CONTACT: Tom Tiesler, Director
Solid Waste Management Section
Division of Environmental Sanitation
Bureau of Environmental Health Services
State Department of Public Health
Capital Hill Building, Room 320
Nashville, Tennessee 37219
(615) 741-3424

PROJECT TYPE: State loan program
State operations grants program

METHOD OF FINANCING: Loan program: \$48 million; Grants program: \$1 per capita (maximum)

PROJECT STATUS

The State of Tennessee has two financial programs for local government implementing resource recovery systems:

- The State Legislature has authorized a \$48 million loan program. The State will issue general obligation bonds and lend the proceeds to local governments. Regulations have been drafted that stipulate the requirements for projects and qualifications of local governments.
- The State also has an operation grants program. In this program, cities and counties that have disposal facilities that are in compliance with environmental regulations can qualify for an operational subsidy of \$1 per capita in their local jurisdiction. Resource recovery facilities will qualify for this incentive.

Also see project descriptions of Memphis and Nashville.

STATE OF WASHINGTON

PROJECT CONTACT: Charles Cross, Head
Resource Recovery Section

Solid Waste Management Division
Washington State Department of Ecology
Olympia, Washington 98505
(206) 753-3801

PROJECT TYPE: Grant and loan program

CAPITAL COST: \$30 million in grants and loans

METHOD OF FINANCING: State appropriation

PROJECT STATUS

The State of Washington is administering a 6-year \$30 million grant and loan program for resource recovery and solid waste disposal. At present, moneys given for resource recovery have either been for planning or for small-scale materials recovery demonstrations.

Also see project description of Seattle.

STATE OF WISCONSIN

PROJECT CONTACT: J. R. Castner, Executive Director
Wisconsin Solid Waste Recycling Authority
c/o Department of Administration
3321 W. Beltline Hwy.
Madison, Wisconsin 53713
(608) 266-2686

PROJECT TYPE: Feasibility study for Region I (Oshkosh, Appleton, Fond du Lac area)

CAPACITY: 1,200 TPD (maybe not at a single plant)

METHOD OF FINANCING: Revenue bonds

PROJECT STATUS

The State of Wisconsin has recently created a Solid Waste Recycling Authority with powers to plan, design, finance, construct, acquire, lease, contract, operate, and maintain resource recovery facilities within designated recycling regions. Three initial recycling regions encompassing 11 counties have been established. Funds have been appropriated for the authority's initial startup costs, and the law establishes bonding authority for capital costs. Unique features of the Wisconsin plan include:

- *Mandatory Compliance.* In order to insure a large waste stream for economies of scale, to reduce risks for investors, and to provide a continuous supply of materials for their markets, the authority has control of all waste collected within the designated regions and must approve all disposal or recovery facilities.

- *Cost Guarantees.* During the first 3 years of operation, rates and charges for approved facilities may be reduced by the authority, but they may not be increased.
- *Site Purchase.* The authority must purchase, given certain provisions, operating municipal disposal sites that are offered for sale by the municipality.
- *Private Sector Involvement.* To insure the use of the private sector, the authority is limited to 40 employees.

The State constitutionality of the authority was challenged but was upheld by the Wisconsin Supreme Court in November 1975.

The authority is now concentrating its efforts on Region I (Appleton, Oshkosh, Fond du Lac area), as its legislation requires. Market and waste stream surveys have already been done, and a technology has been tentatively selected (shredded and air-classified fuel). Further work is underway to firm up markets and waste-stream information, to determine the technical and economic feasibility of the preferred technology, and to evaluate alternative technologies. This work is being done with the assistance of Henningson, Durham, and Richardson under an EPA planning grant; a report is due in October 1976.

The authority's future plans are to make a final technology selection, obtain market contracts, identify a plant site, and select a procurement approach (i.e., a convention, a turnkey, or a full-service approach). An RFP will then be developed by the end of 1976.

Also see project description of Milwaukee.

Appendix A

Communities Recovering Only Ferrous Metal, 1975*

Charlestown, South Carolina	Oakland, California
Chicago, Illinois	Odessa, Texas
Columbus, Ohio	Omaha, Nebraska
Great Falls, Montana	Philadelphia, Pennsylvania
Harrisburg, Pennsylvania	Richmond, California
Houston, Texas	Rochester, New York
Los Gatos, California	Sacramento, California
Louisville, Kentucky	Sacramento County, California
Madison, Wisconsin	St. Petersburg, Florida
Martinez, California	San Diego, California
Menlo Park, California	San Francisco, California
New Castle County, Delaware	Scottsdale, Arizona
	Stickney, Illinois

*Resource Technology Corporation. *Solid Waste Processing Facilities*. Washington, American Iron and Steel Institute, Feb. 1976. 400 p.

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