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SOLID WASTE MANAGEMENT TECHNOLOGY AND SERVICES

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U.S. Agency for International Development**

Prepared by

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INTRODUCTION

This document has been designed to assist cities, provinces, regional agencies, other local governments and central governments in the selection and purchase of municipal solid waste management equipment. Included is a list of U.S. manufacturers of equipment and their equipment selections. The equipment selection process is discussed. This process urges the development of a customer service delivery plan wherein the equipment selected is matched to the methods utilized and the people involved in carrying out the plan.

The following information is not intended to answer all questions about municipal solid waste management equipment, but rather it provides contacts with manufacturers and other technical assistance resources.

II. SOLID WASTE MANAGEMENT AND EQUIPMENT

Throughout the world local communities recognize the need for a system to properly store, collect and dispose of waste products. The basic waste component of most communities is household and commercial waste which together are commonly referred to as municipal solid waste. Complex industrial and hazardous wastes are also significant, but require specialized techniques and equipment which are beyond the scope of this publication. The process by which municipal solid waste is handled is Municipal Solid Waste Management.

Solid Waste Management is the orderly process of identifying, storing, collecting and disposing of societies' waste products. Disposal can mean landfill disposal, recycling or the reclaiming the waste material. Having a successful disposal program requires a multitude of resources. These resources must work in concert with the local solid waste management plan.

A community's solid waste management plan usually incorporates the goals of public health, safety, and environmental protection in a cost-efficient and cost-effective manner. Within this plan, communities must define customer requirements and the levels of services to be provided. Local, state or national government regulations further regulate waste system management. Incorporating government regulations, service levels and customer requirements a service delivery plan is formulated. The selection of equipment, personnel, and facilities is dictated by the service plan. The service delivery plan defines the parameters or requirements for equipment purchases. Equipment should not be purchased and a system should not be operated without a service plan.

To design a service plan, elected and non-elected public officials must understand basic cultural environment and community values. The type and processing of food waste, paper, etc. must be understood. Cultural practices must be recognized and economics must be considered when selecting storage containers and planning storage space. Disposal or reclamation options must also be assessed. When service needs are understood and the reality of a practical and affordable response is considered a service plan begins to evolve. Assistance to communities in developing this service plan is usually available through the national government, private consulting organizations and solid waste trade organizations.

Once defined, the service plan must be implemented by determining equipment and personnel requirements as well as customer preferences and abilities. To understand how these three factors interrelate, a solid waste manager must specify needs by analyzing the basic steps in handling municipal solid waste. The following text outlines these basic steps in relationship to equipment.

(A) STORAGE AND STORAGE CONTAINERS.

The first step in solid waste handling is the temporary storage requirement within which containers are utilized to store the waste or recyclable materials. Temporary storage includes the following collection rules. Collection at a minimum of one time per week is strongly encouraged to prevent food and other putrescible waste from creating odors, attracting vectors, and spreading disease viruses and bacteria. Climate conditions may dictate other collection schedules. A number of cities in developing countries mandate daily collection which is not cost-effective. Even given the different composition of solid waste in the developing world, cities

should collect no more than three times per week, provided there are adequate individual or group storage containers for the waste. Taking into consideration the collection schedule, the type and number of containers should be specified. The containers are usually the responsibility of the customer. As a minimum requirement, the containers should be leak proof and durable. Also, the containers should be sized so as not to exceed the equipment or manpower capability for transfer from the storage point to the collection vehicle without spillage. Many collection systems fail because managers neglect to consider the role of the customers' preferences and limitations within this process. When these points are not considered, often special carts or lifting devices must be provided which add to system cost.

Upon deciding to select, specify or furnish containers it must be remembered that durability, ease of handling (both by customer and collection crew), transportability and ease of emptying need to be taken into account. Beyond the selection and purchase of containers a system of container accountability and maintenance must also be designed and implemented.

(B) THE STORAGE SPACE.

The second step is closely related to the first. The required number of containers must be stored in the allocated space. Cultural considerations, usage and waste types will dictate the space necessary. Containers must be selected to reflect the storage space available. If storage space is limited, more frequent collection at additional cost may be required. The options available and the potential consequences should be presented to the customers allowing them to determine the frequency of collection. Of course everyone cannot be satisfied so a schedule that is most cost

efficient and effective for the majority of customers should be selected.

(C) COLLECTION POINT.

The third step is the selection of the collection point. This involves transporting the storage containers to a location which is mutually convenient for the customer and collection crew. The size, weight, and handling characteristics of the container are very important because the capability of the customer to manage the container must be considered. In order to determine the most convenient container size, different containers should be experimented with in various environments so the most appropriate selection can be made. While some variety in container size may be preferred, only a limited amount of diversity can be permitted.

While customer and collection crew agreement with regard to the collection point is very important, unfortunately it is not always possible to attain. If the collection point becomes an issue which cannot be mutually decided, it must be arbitrated so that the implementation of the service plan can be successful. In general the more convenient the collection point is for the customer (i.e. the smaller the amount of movement required by the customer), the more inconvenient the location to the collection crew (i.e. requiring increased effort and additional equipment). The greater the consolidation of storage containers, the fewer number of stops along the collection route will be required which means the more cost efficient service can be provided. In either case the selection of collection equipment will be dictated by the collection point. While solid waste collection is a service, a balance between the best service and the most cost effective service must be struck.

(D) TRANSPORTATION OF STORAGE CONTAINER TO COLLECTION VEHICLE.

Carrying the storage container to the collection vehicle and emptying it is the fourth step. As far as efficient management is concerned, this is one of the most critical steps within the process because it is during this step that injury of personnel can result. To make this stage efficient, the storage container must be located to provide easy access, handling, and emptying. During this stage the collection vehicles must have sufficient clearance to approach close to the collection point without compromising time on the route. Selection of the collection point, driver skill as well as vehicle steering and turning radius which determines the vehicle's flexibility in handling various street configurations are all key to this stage. The weight, handling and lifting features of the storage containers are also important, possibly dictating the type of collection vehicle (front, side or rear loading).

(E) TRANSPORTING AND DISPOSAL ARRANGEMENTS FOR WASTE.

The fifth and final step in solid waste handling is the transportation and disposal arrangements for the waste. Until this point in the process the focus of the service plan has been primarily the needs of the customer. Now the operation of the system must be considered. Collection vehicles must be selected that will best accommodate the rapid loading, movement of the collected waste along a designated route and then to a disposal point. It is important to understand the equipment efficiencies on both local streets and long hauls to the disposal site. Routing decisions can be best made by using macro route balancing and micro routing principles. It is important that a routing schedule be devised first, then the equipment can be selected. Equipment selection may alter routing schemes due to the maneuverability and capacity of the

vehicles, but these options should be undertaken only as a last resort. It should be remembered that equipment is a tool to accomplish the task.

It is important to remember that the more sophisticated the equipment the more complicated and intensive the maintenance requirements will be. Before selection of the equipment, it is essential that the purchaser understand his maintenance capability or possible improvements. The equipment manufacturer service capability and parts availability must also be considered. If adequate parts supply systems are not available adequate backup equipment and parts must be purchased to insure service reliability in order to protect public health and the environment.

Another part of the fifth step is the ultimate fate of the waste product. At this point the waste product is either processed for recycling or disposed to eliminate health or environmental damage. It must be decided whether the waste material will be reused, recycled or reclaimed. Recycling must "up value" the material being processed. "Up value" can only be accomplished if handling is minimized, processing is cost effective and the products are saleable in a raw or remanufactured form. Equipment selection in all these stages is critical because it could mean the difference between profit or loss. Success depends upon the equipment's maintainability and functionability.

If the disposal option selected is landfilling, certain disposal considerations are in order. Landfilling is the process by which waste is encapsulated in a soil protected package in order to allow degradation without health or environmental liability. Therefore landfill equipment should be sized to suit the site and the waste volume. Equipment purchased must be of appropriate size to handle the volume of waste.

Included will be road construction and maintenance equipment, soil excavation, hauling and placement equipment and compaction of waste equipment. Auxiliary equipment in this process consists of dust control (water truck), litter control, gas and lechate control management equipment.

Throughout this discussion several themes prevail. First, the customer must be foremost in the mind of the solid waste management authority. Clear, reasonable and health defined regulations are imperative to the process. Second, versatility of equipment to meet varied collection and disposal requirements is essential. Finally, equipment maintainability is crucial. The management authority must discern its capability now and what it will be in the future in order to keep the solid waste equipment serviceable and in conformance to manufactures specifications.

III. EQUIPMENT SELECTION AND PURCHASE

(A) EQUIPMENT SELECTION

In the previous section the solid waste service plan was utilized to identify who would be served, determine the extent to which service would be provided and how service would be implemented. The steps in providing that service were reviewed. In this process service requirements are matched with a service method. For example, it may be determined that residential solid waste must be collected twice weekly on a Monday through Friday schedule. It might also be determined that the manual collection of waste from individual residences will be continued. Using the routing techniques (macro, micro, and routing balancing) it is then determined how many pieces of equipment are needed to store and transport the waste. For the processing and/or disposal end, it is determined what will be done with the waste volume and the types and production equipment necessary to process this waste stream in the time allotted. Superimposed on this system are accommodations to meet government regulations related to municipal solid waste management.

After the number, types and production requirements of equipment are known this information must now be translated into a document based upon which various manufactures can propose their equipment offerings which will satisfy the requirements. For example, it may be decided that the maximum a collection crew can physically handle before going to the landfill is eight tons of residential solid waste. With this decision made, the determination of the size and type of truck would be based upon different truck compaction capabilities. This comparison would

also consider the maneuverability of the vehicle along the street system and the vehicle's durability with regard to terrain and climate. In addition it may be decided that collectors will pick up on both sides of the street and load on the side. Now the performance requirements of the vehicle to be purchased have essentially been defined.

The same analysis can be applied to the sanitary landfill. For example, if it has been projected that waste will arrive at a peak rate of 50 tons an hour for four hours and the remaining six hours in the day waste will arrive at a rate of 20 tons per hour, landfill compactors capable of handling this flow rate and achieve a minimum of two to one compaction ratio are desired. This information will set the performance standards that the equipment manufacturer must meet. The equipment performance standards determined from the service plan can be utilized to select possible manufacturers or suppliers.

Now that the type and performance characteristics are known, other major issues must be reviewed before preparing a request for purchase or purchase order.

(1) **Fuel.** The type of fuel used will dictate the type of engine, the related features which use the energy from the engine and the performance capability of the equipment in general. Like engine performance, maintenance requirements and repair parts will differ depending on the fuel used. The manufacturers should be contacted for equipment availability with the use of a particular fuel, performance and maintenance requirements and the supply system for parts and service. Once these conditions are known, performance requirements can be specified in the equipment specification purchase request.

When deciding on a type of fuel system, fuel cost and long term availability must be assessed. Changing fuel systems is a very costly and time consuming endeavor. Therefore, a constant review of fuel markets and fuel performance must be undertaken for astute long range decisions.

(2) Personnel. The competence of the personnel which operates, maintains and supervises the solid waste system is critical. The skill level of the system personnel that can be expected for the levels and training provided must be known. The equipment selected must be compatible with those skill levels. Although operational skills are important, the maintenance personnel must also have the know how, tools and facilities to maintain the equipment. With the advent of more sophisticated operating systems and computer technology, maintenance skills are even more demanding. The potential for increased needs must be understood and compared to the realistic capabilities of the maintenance staff.

A good way to make as complete an assessment as possible of the equipment is to contact the manufacturer and obtain the locations where the manufacturer's equipment is in use. These equipment users can be contacted to discuss equipment performance, maintenance requirements and required personnel skills. This information regarding what is available and personnel capabilities required can be translated into the performance requirements outlined in the equipment performance specifications.

(3) Parts and Service. Equipment must constantly be maintained from routine checks and preventive maintenance to breakdown repair. These maintenance and repair operations must be completed in an orderly and timely manner so the

equipment can meet the service needs for which it was purchased. A skilled mechanic is essential but is limited by the availability of parts and service. Therefore, it is important to understand the manufacturer's supply and service system and what can realistically be expected. Again, talking with existing equipment users is important in making this evaluation. The parts and service system requirements should be reflected in your equipment specifications.

In looking at parts as well as service and maintenance personnel, the standardization or limitation of the variety of equipment types should be considered. This minimizes both parts inventories and the number of supply systems. It could also allow the leveraging of equipment suppliers in providing timely service.

Finally, an important part of the maintenance and supply system is documentation. It is imperative that good records of equipment service are kept. Special problems with component parts should be noted so the manufacturer can be persuaded to correct the problems or design a new system. These records are also important for the comparison of operating performance for future equipment selection.

(4) Service Facilities. The service facilities for equipment maintenance and repair must be identified. Included would be buildings, parking and tools to accomplish the maintenance and repair. These facilities should be located as to complement the operating plan. The manufacturers can be contacted for their recommendation and inquiries can be made to other operators to find out their experiences. These facilities are not a part of the equipment purchase but could place limitations on the type and number of pieces of equipment purchased. For example, if the equipment purchased requires special facilities such as a "clean room" to service

computer components, this information is needed before the purchase is made so that it can be ensured that this requirement can be met or that the equipment specifications can be altered to avoid this maintenance requirement.

(B) EQUIPMENT PURCHASE PROCESS

This section outlines the suggested process for purchasing equipment. The process includes: determining the equipment performance standards and the number of units, specification document preparation, solicitation and selection process, and equipment delivery and acceptance.

(1) Equipment Performance Standards and Units.

The development of equipment performance standards and the number of units to purchase has been discussed in previous sections. These standards must be translated into specific, quantitative terms in the specification such as "the vendor shall furnish 15 compactor bodies with a capacity of 25 cubic yards and a compaction rate of 700 pounds per cubic yard".

In writing a specification, performance requirements are the key. The manufacturer should not be told how to build the unit, but rather how the unit should perform and the maintenance standards desired.

(2) Purchasing Documents.

The purchasing documents consist of (a) the bid or proposal which includes equipment specifications and performance requirements, (b) a vendor proposal response form, (c) the purchase order to buy the equipment, (d) the evaluation form to be used when the equipment is reviewed (e) and a payment voucher which goes to the vendor upon satisfactory delivery of the equipment.

The equipment specification is a very explicit document which quantifies the specific performance requirements which the equipment manufacturer must meet. These requirements should be clearly worded and not subject to interpretation. The specification should not tell manufacturers how to build the equipment but should indicate specific operating or maintenance features that are needed. The bid or proposal should specify a method for clarifying the specification should it be necessary. It is important to remember that adequate time must be allowed for all vendors to change their bid proposal, should a revision to the specification be necessary.

The bid proposal form usually contains a section called "boiler plate" or standard practices and requirements of the purchasing entity for all its purchases. This is also the section of the document where any general legal, health or safety requirements would be identified. In addition to the "boiler plate" section the bid proposal form outlines the proposal that is to be received, how the proposal must be completed, how errors or disputes are resolved, the right of the entity to reject bids and when the equipment must be delivered. It is important that this document receive a legal review since it could be questioned if a dispute required a judicial hearing or resolution.

The bidders or vendors response form should be a simple document utilized to quote the quantity and price offered for the equipment. The bidder should be required to quote the price in numerical and written form. Should a discrepancy occur the written form of the price is generally used as the bid price. The bid proposal form should be signed by a person able to commit to the proposal.

Often a bid bond or surety is required with the bidders proposal form. This surety is rendered to help guarantee that the selected bidders will not withdraw the company's bid. Because it may discourage small suppliers, care should be used when requiring a surety since. Again, other equipment users can be contacted regarding their experiences.

(3) Bid Solicitation and Selection Process.

This is a critical phase in the purchasing process. Competition among suppliers and quick selection weigh heavily on the price offered by a bidder. The bid on vendor proposal should be sent to as many prospective bidders as possible. Allow ample time to prepare the bids, eg. 30-90 days. Offer opportunities to answer questions. Any answer or clarification made should be shared with all bidders. The date and time certain bids must be reviewed and opened should be announced in the bid proposal. Bids should be opened and read in public.

After the bids are opened they should be quickly reviewed and the low, qualified bidder should be determined. "Low" refers to the price. "Qualified" refers to satisfaction of all terms, conditions and specifications of the proposal. The low, qualified bid should be processed quickly through the review and contract award process. This is very important because it allows all bidders to release their bid surety and use the remaining financial bidding capacity on other projects. Usually this quick decision results in the bid being lower because no cost is included which would restrict further bidding capacity.

(4) Equipment Delivery and Acceptance.

Once the contracts are awarded, the successful manufacturer has a limited timeframe within which the equipment must be delivered. This delivery time is specified in the bid proposal. The "boiler plate" specification outlines the action to be taken should the delivery not occur on time. Some provisions should be permitted to allow the contractor some leeway. Of course documentation of delivery performance is important for future bids.

Taking delivery of the equipment is very important. The equipment must be thoroughly checked for specifications compliance. If deficiencies are noted, the equipment should not be used because it will void guaranties and possible warranties. The manufacturer should be held to the requirements of the bid proposal and contract.

After the equipment is received, it must be ensured that the operators are properly trained regarding the use of the equipment. Maintenance personnel should be instructed often on maintenance requirements and any special service or repair practices. Schedules should be prepared for warranty maintenance and regular repairs to keep equipment within specification and operating parameters.

This concludes the purchase process. The process is involved and often detailed, however, properly followed it will guarantee a product at a competitive price, delivered on time and within specification requirements. To alter or "short circuit" the process usually leads to a poor product and untimely delivery schedules.

IV. SOLID WASTE MANAGEMENT EQUIPMENT MANUFACTURERS

11

REFUSE COLLECTION VEHICLES

FRONT LOADING:

The following manufactures provide front loading compactors in various capacities from 18 to 40 cubic yards. Packer mechanisms are offered with lifting mechanisms and ejection systems. All operational controls are located in the chassis cab. Ejection systems may be ordered fully automated or gravity dump. In selecting a packer capacity and lifting system, the user must determine the container size, expected weight of container with waste and maneuverability required of the vehicle. Front loaders are usually used for commercial, industrial or multi-family residential service.

A

Able Body Co., Inc.
796S Enterprise Drive
P.O. Box 891
Newark, CA 94560
(510) 796-5611 Fax (510) 796-3133

Able Body Sales and Service, Inc.
P.O. Box 1006
8357 Loch Lomond Dr.
Pico Rivera, CA 90660
(310) 949-0666 Fax (310) 949-3594

Amrep, Inc.
1555 S. Cucamonga
Ontario, CA 91761
(213) 566-1131

C

Cameron Equipment Corp., Inc.
9290 S.W. 117th Terr.
Miami, Florida 33176

Capital Disposal Equipment, Inc.
1940 Albion Rd.
Rexdale, Ontario, Canada M9W 5T2
(416) 675-7285

Crane Carrier Co.
Box 582891, 1925 N. Sheridan
Tulsa, OK 74158

D

Dempster Systems
a Subs. of Krug Int'l, Eastern Div.
P.O. Box 1388, 302 N. Sage St.
Toccoa, GA 30577
(706) 886-6556 Fax (706) 886-4316

F

Fanotech Ind., Inc.
Box 1538
Muskoka Rd. #4
Bracebridge, Ont., POB 1CO
(705) 645-3045

H

HEIL CO.
Box 8676
Chattanooga, TN 37411
(615) 899-9100

L

Leach Co.
2737 Harrison St
P.O. Box 2608
Oshkosh, WI 54903
(414) 231-2770 Fax (414) 231-4571

Lodal, Inc.
P.O. Box 2315
Kingsford, MI 49801
(906) 779-1700 Fax (906) 779-1160

M

Maxon Refuse Div.
1960 Slauson Avenue
Huntington Park, CA 90255
(213) 583-3050 Fax (213) 582-3032

McNeilus Truck & Mfg., Inc.
P.O. Box 70
Dodge Center, MN 55927
(507) 374-6321 Fax (507) 374-6306

Mr. Garbage U.S.A. Inc.
Chinquapin Round Rd.,
Annapolis, MD 21401
(301) 268-1144 Fax (301) 268-5618
(410) 268-5618

P

Pak-Mor Mfg. Co.
P.O. Box 14147
1123 S.E. Military Dr.
San Antonio, TX 78214
(512) 923-4317 Fax (512) 922-7782

Peabody Gallion
Box 607
Galion, OH 44833
(419) 468-2120 Fax (419) 468-4895

S

Stagg Equipment
7337 Central Avenue
Riverside, CA 92504
(714) 354-5529 Fax (714) 354-8731

U

Universal Handling Equip. Co.
Box 3272, Station C
Hamilton, Ontario, Canada

W

Wittke Iron Works Co., Ltd.
1496 Brier Crescent NW Pk.,
P.O. Box 1180
Medicine Hat, Alberta, Canada T1A 7H3
(403) 527-8806

REAR LOADING:

The following manufacturers provide rear loading packer bodies in varying capacities from 18 to 40 cubic yards. Waste is placed in a bin or hopper in the rear ranging in capacity of 1 to 3 cubic yards. When full the packer empties and compacts the waste into the main packer body. Most packer bodies can be equipped with load control switches which automatically shuts down the loading process once the rated packer capacity has been reached. Also, lifting devices can be attached to the rear hopper allowing for automatic lifting and emptying of containers. These lifting devices are often called "flippers or tippers". Once these devices are installed the collection systems may be rated as semi automated system.

C

Capital Disposal Equip. Inc.
1940 Albion Road
Rexdale, Ontario, Canada M9W 5T2
(416) 675-7285

Crane Carrier Co.
Box 582891
1925 N. Sheridan
Tulsa, OK 74158

D

Dempster Systems Subs. of
Krug Int'l, Eastern Div.
P.O. Box 1388, 302 N. Sage St.
Toccoa, GA 30577
(706) 886-6556

G

G & H Mfg., Inc.
P.O. Box 300
1018 Commercial Blvd. N.
Mansfield, TX 76063
(817) 467-9883 Fax (817) 468-3272

H

HEIL CO.
Box 8676
Chattanooga, TN 37411
(615) 899-9100

J

Jaeger Canada Equipt. Ltd.
43 Gaylord Rd.
St. Thomas, Ontario, Canada N5P 3S1
(519) 631-5100

L

Leach Co.
2737 Harrsion Street
P.O. Box 2608
Oshkosh, WI 54903
(414) 231-2770

Loadmaster Corp.
500 Hackney Ave.
Culpeper Air Park
P.O. Box 1006
Culpeper, VA 22701-1006

M

Martco Waste Systems Equipt.
P.O. Box 29506
Dallas, TX 75229-0506
(214) 358-3165

McNelius Truck & Mftg., Inc.
P.O. Box 70
Dodge Center, MN 55927
(507) 374-6321

Mr. Garbage U.S.A. Inc.
Chinquapin Round Rd.
Annapolis, MD 21401
(301) 268-1144

P

Pak-Mor Mfg. Co.
P.O. Box 14147
1123 S.E. Military Drive
San Antonio, TX 78214
(512) 923-4317

Peabody Galion
Box 607
Galion, OH 44833
(419) 468-2120

S

Scranton Mfg. Co., Inc.
P.O. Box 336
Scranton, IA 51462
(712) 652-3396

W

Wayne Engineering Corp.
Box 648
Cedar Falls, IA 50163
(319) 266-1721

SIDE LOADING

The following manufactures provide side loading packer bodies. Side loading packer bodies are classified as manual, semi-automated or automated. Also, side loaders can be combined with driver walk out chassis for a one-man operation with manual pick up. Semi-automated side loaders are equipped with lifter mechanisms for the collector/laborers to attach the refuse container. For automated side loaders, lifting mechanisms extend out to lock containers and lift waste into the packers body. Lifter mechanisms can be purchased for containers ranging from 90 gallons to 4 cubic yards. Packer bodies range in capacity from 18 to 40 cubic yards.

In most cases side loaders are used for commercial or industrial use. Lifting mechanisms must be selected to accommodate the weight of the container and waste. Also, the maneuverability of the collection vehicle must be considered. It is very important that the user select container locations that can accommodate the collection vehicles capabilities.

A

Able Body Co., Inc.
7969 Enterprise Drive
P.O. Box 891
Newark, CA 94560

Able Body Sales and Service, Inc.
P.O. Box 1006, 8357 Loch Lomond Dr.
Pico Rivera, CA 90660
(213) 949-0666

- 22 -

Athey Products Corp. Waste Control Systems Div.
Box 669
Raleigh, NC 27602
(919)556-5171

C

Crane Carrier Co.
Box 582891
1925 N. Sheridan
Tulsa, OK 74158

G

G & H Mfg., Inc.
P.O. Box 300
1018 Commercial Blvd. N.
mansfield, TX 76063
(817) 467-9883

H

Haul-All Equpt. Ltd.
4115 18th Ave.
Lethbridge, Alberta, Canada T1H 5G1
(403) 328-7719

HEIL CO.
Box 8676
Chattanooga, TN 37411
(615) 899-9100

L

Labrie Equpt. Ltd.
175, Route Dupont
Saint-Nicholas, Quebec, Canada G0S 2Z0
(418) 831-8250

Lodal, Inc.
P.O. Box 2315
Kingsford, MI 49801
(906) 779-1700

M

Matco Waste Systems Equpt.
P.O. Box 29506
Dallas, TX 75229-0506
(214) 358-3165

Maxon Refuse Div.
1960 Slauson Ave.
Huntington Park, CA 90255
(213) 583-3050

McClain Industries, Inc.
Box M.
Utica, MI 48087
(313) 264-3611

P

Pak-Mor Mfg. Co.
P.O. Box 14147
1123 S.E. Military Drive
San Antonio, TX 78214
(512) 923-4317

Peabody Galion
Box 607
Galion, OH 44833
(419) 468-2120

6

Peerless Corp.
P.O. Box 447
18205 SW Boones Ferry Rd
Tualatin, OR 97062
(503) 639-6131

R

Rand Automated Compaction Systems, Inc.
P.O. Box 27746
Raleigh, NC 27611-7746
(919) 790-9600

S

Scranton Mfg. Co., Inc.
P.O. Box 336
Scranton, IA 51462
(712) 652-3396

SHU-PAK Refuse Eqpt. Inc.
1101 Dundas St
P.O. Box 726
Woodstock, Ontario, Canada N4S 8A2

Stagg Eqpt.
7337 Central Ave.
Riverside, CA 92504
(714) 354-5529

W

Wayne Engineering Corp.
Box 648
Cedar Falls, IA 50163
(319) 266-1721

Wittke Iron Works Co., Ltd.
1496 Brier Crescent NW Pk.
P.O. Box 1180
Medicine Hat, Alberta, Canada T1A 7H3
(403) 527-8806

SIDE LOADING (Recyclables)

The following manufactures provide specialized side loading vehicles for recyclable materials. This vehicles are normally non-compacting or open bodies for containing recycling materials. The container bodies come with varying number of compartments. Small variations may include a compaction mechanism for recycalables. Another feature are chassis that allow direct step out for the driver. This feature allows the driver easy access out of the cab to collect and deposit the

recyclable materials in the appropriate compartment. When selecting these specialized vehicles, the quantity and number of recyclables must be determined to assure adequate capacity.

A

Able Body Co., Inc.
7969 Enterprise Drive
P.O. Box 891
Newark, CA 94560
(415) 796-5611

Able Body Sales and Service, Inc.
P.O. Box 1006
8357 Loch Lomond Dr.
Pico Rivera, CA 90660
(213) 949-0666

Accurate Industries, a Sudbury Co.
Box 451
Williamstown, NJ 08094
(609) 629-2800

Alcoa Recycling Machinery Services
2665 Rivergate Rd.
Memphis, TN 38109
1-800-288-ARMS

American Roll-Off Automated Waste Eqpt. Co.
P.O. Box 5757
Trenton, NJ 08638
(609) 588-5400

Amthor's Inc.
307 State Rte. 52 E.
Walden, NY 12586
(914) 778-5576

Apex Welding, Inc.
30 W. Interstate St.
Cleveland, OH 44146

Automated Waste Eqpt. Co., Inc.
P.O. Box 5757
Trenton, NJ 08683
(609) 588-5400

B

Brothers Industries, Inc.
Hwy. 59 S.
P.O. Box 409
Morris, MN 56267
(612) 589-1971

C

C-Max Transportation Eqpt.
26 Cornestoga Rd.
St. Jacobs, Ontario, Canada N0B 2N0
(519) 664-3796

CARGOTEC, INC.
307 Broadway, P.O. Box 298
Swanton, OH 43558
(419) 825-2331

D

DARR Truck & Mfg., Inc.
P.O. Box 668
Rushford, MN 55971
(507) 864-7952

**Dempster Systems a Subs. of
Krug Int'l Eastern Div.**
P.O. Box 1388, 302 N. Sage Street
Toccoa, GA 30577
(404) 886-6556

E

Eager Beaver
Interstate 295
Thorofare, NJ 08086
(609) 845-5400

ELFIN MFG., INC.
2431 Rte. 286
Indiana, PA 15701
(412) 349-6300

Elliott Equpt. Co.
N. Brady Industrial Park
P.O. Box 2070
Davenport, IA 52809
(319) 391-4840

F

Frink Int'l
777 Laurel St.
Cambridge, Ontario, Canada N3H 4S3
(519) 653-6234

G

G & H Mfg., Inc.
P.O. Box 300
1018 Commercial Blvd. N.
Mansfield, TX 76063
(817) 467-9883

Galbreath Inc.
P.O. Box 220
Winamac, IN 46996
(219) 946-6631

Geneva Products
675 12th Ave. S. E.
Valley City, ND 58072
(800) 328-7024

H

Haul-All Equpt. Ltd.
4115 18th Ave. N.
Lethbridge, Alberta, Canada T1H 5G1

Hino Diesel Trucks (USA), Inc.
25 Corporate Dr.
Orangeburg, NY 10962
(914) 365-1400

Holden Industries
Rte. 1, Box 151
Southwest City, MO 64863
(417) 762-3218

J

Jaeger Canada Equpt. Ltd.
43 Gaylord Rd.
St. Thomas, Ontario, Canada N5P 3S1
(519) 631-5100

K

Kann-Curb Sorter Recycling Equpt.
414 N. Third St.
P.O. Box 400
Guttenberg, IA 52052
(319) 252-2035

L

Labrie Equpt. Ltd.
175, Route DuPont
Saint-Nicholas, Quebec, Canada G0S 2Z0

LaHass Corp.
3575 State Hwy. 13
St. Paul, MN 55122
(312) 452-1201

Leach Co.
2737 Harrison St.
P.O. Box 2608
Oshkosh, WI 54903
(414) 231-2770

Loadmaster Corp.
500 Hackney Ave.
Culpeper Air Park
P.O. Box 1006
Culpeper, VA 22701-1006

Lodal, Inc.
P.O. Box 2315
Kingsford, MI 49801
(906) 779-1700

M

Marathon Equpt. Co.
Box 1798
Vernon, AL 35592
(205) 695-9105

Maxi Products Co., Inc.
2536 Center Ave.
Janesville, WI 53545
(608) 755-1199

May Mfg. & Distributing Co.
5400 Marshall
Arvada, CO 80002
(303) 423-6200

Multitek, Inc.
P.O. Box 170
Frentice, WI 54556
(715) 428-2000

N

National Recycling Equpt. Co.
190 Service Ave.
P.O. Box 6788
Warwick, RI 02887
(401) 738-7225

Norcia's
R.D. No. 4, Box 451
Black Horse Lane
North Brunswick, NJ 08902
(201) 297-1101

O

Oshkosh Truck Corp.
P.O. Box 2566
Oshkosh, WI 54903
(414) 235-9150

P

Peabody Galion
Box 607
Galion, OH 44833
(419) 468-2120

Peerless Mfg. Co.
U.S. 82 E., P.O. Box 245
Shellman, GA 31786
(912) 679-5353

Petersen Lightning Cyclor, Inc.
434 U.S. Hwy. 27
N. Lake Wales, FL 33853
(813) 676-9688

Peerless Corp.
P.O. Box 447
18205 SW Booras Ferry Rd.
Tualatin, OR 97062
(503) 639-6131

Peterbilt Motors Co.
38801 Cherry St.
Newark, CA 94560
(510) 790-4000

R

Rand Automated Compaction Systems, Inc.
P.O. Box 27746
Raleigh, NC 27611-7746
(919) 790-9600

Rogers Mfg. Co., Inc.
P.O. Box 100187
Nashville, TN 37224
(615) 244-9720

Refuse Truck, Inc.
4849 Murietta St.
Chino, CA 91710
(714) 590-0200

Rudco Products, Inc.
114 E. Oak Rd., P.O. Box 705
Vineland, NJ 08360
(609) 691-0800

S

SAC Recycling Systems, Inc.
600 Nutmeg Rd. N.
P.O. Box 769
So. Windsor, CT 06074
(203) 282-8282

Scranton Mfg. Co., Inc.
P.O. Box 336
Scranton, IA 51462
(712) 652-3396

T

Tafco Equpt. Co.
Hwy. 16 W., P.O. Box 339
Blue Earth, MN 56013
(507) 526-3247

Team Recycling Systems, Inc.
234 Fifth Ave., 4th Floor
New York, NY 10001
(212) 889-3600

Timsco Inc.
R.D. 5
Box 184-1A, Rte. 219 S.
Somerset, PA 15501
(814) 445-5866

W

Walinga, Inc.
R.R. # 5
Guelph, Ont., Canada N1H 6J2
(519) 824-8520

Wasp Recycling Equpt.
Box 100
Glenwood, MN 56334
(612) 634-5126

Wayne Engineering Corp.
Box 648
Cedar Falls, IA 50163
(319) 266-1721

REFUSE COLLECTION VEHICLES CHASSIS

The following manufactures provide vehicle chassis for various collection and hauling needs. Most manufactures offer a varied selection of vehicles. It is important users match the packers, etc. with the appropriate chassis. Most packer manufactures provide specifications for chassis. It is important that users review the drive train and transmission system.

C

Chevrolet Motor Div.
30007 Van Dyke Ave.
Warren, MI 48090

Crane Carrier Co.
Box 582891
1925 N. Sheridan
Tulsa, OK 74158

F

FWD Corp.
East 12th Street
Clintonville, WI 54929
(715) 823-2141

Ford Truck Company
300 Renaissance Center
P.O. Box 43308A
Detroit, MI 48243
(313) 446-4042

Freightliner Corp.
800 Mittel Drive
Wood Dale, IL 60191
(708) 350-3190

G

GMC Truck Div., Truck & Bus Group
 31 Judson St.
 Pontiac, MI 48058
 (313) 456-5430

H

Hino Diesel Trucks (USA) Inc.
 25 Corporate Dr.
 Orangeburg, NY 10962
 (914) 365-1400

I

Isuzu Truck of America, Inc.
 1180 Durfee Ave., Ste. 100
 S. El Monte, CA 91733
 (818) 350-8980

K

Kenworth Truck Co.
 P.O. Box 1000
 Kirkland, WA 98083
 (206) 828-5000

M

Mack Trucks, Inc.
 P.O. Box M
 Allentown, PA 18105
 (215) 439-3011

McClain Industries, Inc.
 Box M
 Jtica, MI 48087
 313) 264-3611

Mercedes-Benz of N. America, Inc.
 One Mercedes Dr.
 Montvale, NJ 07645

Mitsubishi
 Fuso Truck of America, Inc.
 100 Center Square Rd.
 P.O. Box 464
 Bridgeport, NJ 08014
 (609) 467-4500

N

Navistar Int'l Corp., Truck Group
 455 N. City Front Plaza
 Chicago, IL 60611
 (312) 836-2000

Nissan Diesel America
 P.O. Box 152034
 Irving, TX 75015
 (214) 550-8400

Northside Steel Fabricators, Ltd.
 983 Laurel Ave
 Kelowna, B.C., Canada V1Y 7G4
 (604) 682-6288

O

Ottawa Truck Corp.
415 E. Dundee Street
Ottawa, KS 66067
(913) 242-2200

P

Peterbilt Motors Co.
38801 Cherry St.
Newark, CA 94560
(510) 790-4000

R

Refuse Truck, Inc.
4849 Murietta Street
Chino, CA 91710
(714) 590-0200

S

Saab-Scania of America, Scania Truck Div.
One Saab Dr.
Orange, CT 06477
(203) 795-1326

Special Trucks, Inc.
4930 Old Maumee Rd.
Fort Wayne, IN 46803
(219) 493-1100

U

UD Trucks / Nissan Diesel America, Inc.
P.O. Box 152034
Irving, TX 75015
(800) 225-5831

V

Volvo GM Heavy Truck Corp.
P.O. Box 26115
Greensboro, NC 27402-6115
(919) 279-2000

REFUSE COLLECTION SATELLITE VEHICLES

The following manufactures provide smaller collection vehicles for rural or remote collection needs. These collection vehicles usually provide capacity of 6 to 15 cubic yards and provide mechanism to transfer waste to other larger collection vehicles.

Three varieties of vehicles exist. The "scooter" type is an open hopper attached to

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a scooter. Usually the waste is bagged to control blowing. The second is a compactor body attached to a small chassis truck. The chassis may be required to support up to 18,000 lb. GVWR so matching chassis to compactor body is very important. For this second type the compactor body can be manually or semi-automated loading. The third type is a tram configuration. The truck is attached to a series of wheeled containers which are loaded manually or semi-automated. It is important to consider access and maneuverability when selecting this type of configuration. Many manufactures have used this type of configuration in early curb side recycling collection programs.

B

Broyhill Mfg. Co.
N. Market St.
Dakota City, NE 68731
(402) 987-3412

C

Cushman, Inc.
P.O. Box 82409
Lincoln, NE 68501
(402) 475-9581

G

Geneva Products
675 12th Avenue, S.E.
Valley City, ND 58072
(800) 328-7024

H

Haul-All Equpt. Ltd.
4115 18th Ave., N.
Lethbridge, Alberta, Canada T1H 5G1
(403) 328-7719

M

Marathon Equpt. Co.
Box 1798
Vernon, AL 35592
(205) 695- 9105

P

Peerless Corp.
P.O. Box 447
18205 SW Boones Ferry Rd.
Tualatin, OR 97062
(503) 639-6131

S

Scranton Mfg. Co., Inc.
P.O. Box 336
Scranton, IA 51462
(712) 652-3396

W

Wayne Engineering Corp.
Box 648
Cedar Falls, IA 50163
(319) 266-1721

Wittke Iron Works Co., Ltd.
1496 Brier Crescent NW Pk.
P.O. Box 1180
Medicine Hat, Alberta, Canada T1A 7H3
(403) 527-8806

REFUSE CONTAINERS

Manual Pick-up

The following manufactures provide collection containers for manual collection. Containers provide leak proof lids and are available in metal or plastic. Containers can be purchased in 5 to 35 gallon sizes.

A

Ameri-Kan, Div. of Stoutco Inc.
515 Rd. 200 N.
Warsaw, IN 46580

Ameri-Kart Corp.
433 Industrial Rd.
Goddard, KS 67052
(316) 794-2213

C

CRW Group, Inc.
P.O. Box 23323
Pleasant Hill, CA 94523
(415) 827-1853

Chem-Tainer Industries
361 Neptune Ave.
N. Babylon, NY 11704
(516) 661-8300

Container Components, Inc.
20828 Lassen St.
Chatsworth, CA 91311
(818) 882-4300

Crown Rotational Molded Products, Inc.
Box 577
Marked Tree, AR 72365
(501) 358-3400

I

Industrial Refuse Sales, Inc.
P.O. Box 5075
Lakeland, FL 33803
(813) 665-6507

K

Kirk Mfg.
4052 Hwy. 56
Houma, LA 70363
(504) 868-4233

Kracor Inc.
5625 W. Clinton Ave.
P.O. Box 23667
Milwaukee, WI 53223
1-800-255-6335

R

RobMar Plastic Lids
P.O. Box 326
Clare, MI 48617
(517) 386-9600

Rotonics Molding, Inc.
1320 Ardmore Ave.
Itasca, IL 60143
(708) 773-9510

Mechanical Pick-up Containers and Hoist Equipment

The following manufactures provide large containers and mechanical hoisting systems. These systems are used for commercial, industrial, institutional of multi- family residential communities. The containers can range up to 40 cubic yards. These systems are often called "roll off" systems. The container manufacturers, in addition to providing the larger containers and the "roll off" system, also, provide containers in smaller sizes suitable for small commercial or single family residential collection by

34

front end or side loader compactor vehicles. These systems are commonly acquainted with automated collection systems.

A

**Ameri-Kart Corp.
433 Industrial Rd.
Goddard, KS 67052
(316) 794-2213**

**Automated Refuse Eqpt. Inc.
650 E. 5th St.
Reno, NV 89512
(702) 323-6616**

B

**Bes-Pac Inc.
P.O. Box 1020
201 Allen Street
Easley, SC 29640**

G

**Greif Bros. Corp.
P.O. Box 796
Newark Ind. Pk.
Hebron, OH 43025
(614) 928-0070**

H

**HEIL Co.
Box 8676
Chattanooga, TN 37411
(615) 899-9100**

I

**Industrial Refuse Sales, Inc.
P.O. Box 5075
Lakeland, FL 33803
(813) 665-6507**

K

**Kirk Mfg.
4052 Hwy. 56
Houma, LA 70363
(504) 868-4233**

M

**May Fabricating Co., Inc.
P.O. Box 1029
Beeville, TX 78104-1029
(512) 358-7022**

**Modern, Inc.
P.O. Box 790
Beaumont, TX 77704
(409) 833-2665**

N

NARMCO
603 NE Victory Ave., Ste. 100
Vancouver, WA 98661
1-800-888-3831

O

Otto Industries, Inc.
12700 General Dr., P.O. Box 410251
Charlotte, NC 28241-0251
1-800-227-5885

P

Par-Kan Co.
P.O. Box 219
Silver Lake, IN 46982
(219) 352-2141

Peerless Corp.
P.O. Box 447
18205 SW Boones Ferry Rd.
Tualatin, OR 97062
(503) 639-6131

R

RMIC
1320 Ardmore Ave.
Itasca, IL 60143
(708) 773-9510

RRS Industries, Inc.
P.O. Box 38660
Sacramento, CA 95838
(916) 920-4777

Rapid Rail Systems
1500 S. 7th St.
Phoenix, AZ 85034
(602) 252-6031

Refuse Removal Systems, Inc.
P.O. Box 2258
Fair Oaks, CA 95628
(916) 966-0496

Reuter, Inc.
410 11th Ave., S.
Hopkins, MN 55343
(612) 935-6921

Rotonics Molding, Inc.
1320 Ardmore Ave.
Itasca, IL 60143
(708) 773-9510

S

SSI Schaefer Systems Int'l., Inc.
10021 Westlake Dr., P.O. Box 7009
Charlotte, NC 28241
(704) 588-2150

Shaefer Systems Int'l. Inc.
10021 Westlake Dr., P.O. Box 7009
Charlotte, NC 28241
(704) 588-2150

Snyder Industries, Inc.
4700 Fremont, P.O. Box 4583
Lincoln, NE 68504
(402) 467-5221

T

Toter, Inc.
Box 5338
Statesville, NC 28677
(704) 872-8171

Z

Zarn, Inc.
Box 1350
Reidsville, NC 27320
(919) 349-3324

RECYCLING CONTAINERS (Large)

The following manufacturers provide large containers for recyclable materials. These containers are metal or plastic and equipped with attachments for hoisting to hauling vehicles. The containers are usually taken to processing facilities for the various materials collected. The main difference of this system from the mixed waste mechanical systems is the containers are compartmentalized for storing the various recyclable and off loading mechanism to prevent mixing or contamination of materials.

RECYCLING CONTAINERS (Small)

The following manufactures provide containers for containing recyclable materials set out at the curb. These containers are provided with or without lids. Lids are usually considered in high rainfall areas to prevent damage to materials, especially paper products. The containers are usually designed around collection vehicles for these materials.

A

A-1 Products Corp
P.O. Box 447
19-342 Bronte St. S. Milton
Ontario, Canada L9T 5B7
(416) 875-2588

Apex Welding Inc.
30 W. Interstate St.
Cleveland OH 44146

B

Bes-Pac Inc.
P.O. Box 1020
102 Allen St.
Easley, SC 29640

Buckhorn
55 W. Techne Center Dr.
Milford, OH 45150
(513) 831-4402

Busch Systems Int'l. Inc.
1502 Gregwood Rd., Mississauga
Ontario, Canada L0L 1X0
(705) 722-0806

C

Champion Plastic Container, Inc.
36 Joseph St., Breslau
Ontario, Canada N0B 1M0
(519) 648-3595

Chem-Tainer Industries
361 Neptune Ave. N.
Babylon, NY 11704
(516) 661-8300

Continental Mfg. Co.
123 Byassee
Hazelwood, MO 63042
(314) 731-0402

"Cram-A-Lot" Solid Waste/Recycling Equip.
J.V. Mfg., Inc.
P.O. Box 229
Sprindale, AR 72765-0229
(501) 751-7320

D

D&B Fabricatin
16W065 Jeans Rd.
Lemont, IL 60439
(708) 325-3811

Diversified Recycling Systems
5606 N. Hwy. 169
New Hope, MN 55428-3099
(612) 536-6828

Dover Parkersburg
427 Plymouth Ave.
Fall River, MA 02722
1-800-225-8140

F

FIBREX Inc.
P.O. Box 68010
Virginia Beach, VA 23455
(804) 490-3008

Five Star Metal Farbications, Inc.
2701 Caonverse Ave., East
St. Louis, IL 62207
(618) 271-6250

G

Geneva Products
675 12th Ave. S.E.
Valley City, ND 58072
1-800-328-7924

Glosser Mfg. Co.
P.O. Box 276, 1 Douglas St.
McKeesport, PA 15134
(412) 461-8100

H

Haul-All Equpt. Ltd.
4115 18th Ave., N., Lethbridge
Alberta, Canada T1H 5G1
(403) 328-7719

Hodge Mfg. Co., Inc.
55 Fisk Ave.
Springfield, MA 01107-1072
1-800-262-4634

Hollibaugh Mfg., Inc.
19405 68th NE
Arlington, WA 98223
(206) 435-0815

Holt Specialty Equpt. Inc.
P.O. Box 99, Hwy. 41A, S.
Eagleville, TN 37060
(615) 274-6660

I

IPL Inc.
140 Commerciale, St Damien
Quebec, Canda G0R 2Y0
(418) 789-2880

J

Jedstock Inc.
P.O. Box 4405
Warren NJ 07060
(201) 754-0404

K

Knight Ltd. Corp.
1200 Leesburg Rd.
Ft. Wayne, In 46808

Kotrac Recycling, Inc.
37 Skline Dr., Ste 4304
Lake Mary, FL 32746
(407) 333-0607

L

LEWISystems, Div. of Menasha Corp.
128 Hospital Dr.
Watertown, WI 53094
1-800-999-TOTE

Leland Engineering, Inc.
P.O. Box 698
White Pigeon, MI 49009
(616) 483-7681

M

Maier, C.F., Composites, Inc.
500 E. Crystal
Lamar, CO 81052
(719) 336-8745

Marathon Equpt. Co.
Box 1798
Vernon, AL 35592
(205) 695-9105

Material Systems Inc.
7109 W. Higgins Rd.
Chicago, IL 60656
(312) 631-1451

Meese, Inc.
491 S. Dean St.
Englewood, NJ 07631
(201) 567-5901

O

One Earth Corp.
4831 S. May St.
Chicago, IL 60609

Otto Industries, Inc.
12700 General Dr., P.O. Box 410251
Charlotte, NC 28241-0251
1-800-227-5885

P

Patterson-Williams Mfg.
P.O. Box 4040
Santa Clara, CA 95056-4040
(408) 988-3066

Plastican Inc., Recycling Div.
196 Industrial Rd.
Leominster, MA 01453
(508) 537-4911

R

RRS Industries, Inc.
P.O. Box 38660
Sacramento, CA 95838
(916) 920-4777

Recycling Receptacles, Inc.
905 Murray Rd.
East Hanover, NJ 07936
1-800-442-1010

Rehrig Pacific Co.
4010 E. 26th St.
Los Angeles, CA 90023

Ropak Corp.
660 S. State College Blvd.
Fullerton, CA 92631
(714) 870-9757

Rubbermaid Commercial Products Inc.
3124 Valley Ave.
Winchester, VA 22601
(703) 667-8700

Rudco Products Inc.
114 E. Oak Rd., P.O. Box 705
Vineland, NJ 08360
(609) 691-0800

S

Schaefer Systems Int'l. Inc.
10021 Westlake Dr., P.O. Box 7009
Charlotte, NC 28241
(704) 588-2150

Shamrock Industries, Inc.
834 N. 7th St.
Minneapolis, MN 55411-4394
(612) 332-2100

Southeastern Fibers Inc.
2167 N. Lake Pkwy., Ste. 105
Tucker, GA, 30084
1-800-833-2472

T

Taylor Mfg. Co.
Hwy. 701 S., P.O. Box 518
Elizabethtown, NC 28337
(919) 862-2576

Team REcycling Systems, Inc.
234 Fifth Ave., 4th Fl.
New York, NY 10001
(212) 889-3600

Toter, Inc.
Box 5338
Statesville, NC 28677
(704) 872-8171

U

United Marketing, Inc., Howard Products
14th & Laurel Sts.
Pottsville, PA 17901
(717) 622-7715

W

Witt Co., The
4454 Steel Pl.
Cincinnati, OH 45209
(513) 871-5700

Z

Zarn, Inc.
Box 1350
Reidsville, NC 27320
(919) 349-3324

STATIONARY COMPACTED CONTAINERS

The following manufacturers provide a specialized container used by larger industrial/commercial generators. These generators are usually at shopping centers or commercial sites. Instead of multiple containers a compaction device is chosen to minimize space dedicated to refuse containment. These containers are constructed with a storage container and a compaction mechanism. Waste is deposited in the compactor, then compacted into the storage container. The container is either emptied into a transfer trailer vehicle or is hoisted onto a truck for transport to the disposal site.

A

Accurate Industries, A Sudbury Co.
Box 451
Williamstown, NJ 08094
(609) 629-2800

Atlas Refuse Eqpt., Div. of Richler
Hydraulics Inc.
7600 Cote De Liesse Rd.
Montreal, Quebec H4T 1E9

B

BRASK Enterprises, Inc.
P.O. Box 800335
Houston, TX 77280-0335
1-800-848-8805

Bes-Pac Inc.
P.O. Box 1020, 201 Allen St.
Easley, SC 29640

C

"Cram-A-Lot" Solid Waste/Recycling Equip.
J.V. Mfg., Inc.
P.O. Box 229
Springdale, AR 72765-0229
(501) 751-7320

D

Dempster Systems
A Subs. of Krug Int'l., Eastern Div.
P. O. Box 1388, 302 N. Sage St.
Toccoa, GA 30577
(404) 886-6556

E

Elliott Eqipt. Co.
N. Brady Industrial Pk., P.O. Box 2070
Davenport, IA 52809
(319) 391-4840

G

Galbreath Inc.
P.O. Box 220
Weinamac, IN 46996

Global Eqipt., Inc.
E. 10310 Montgomery
Spokane, WA 99206
(509) 924-9496

Gloser Mfg. Co.
Holt Specialty Eqpt. Inc.
P. O. Box 276, 1 Douglas St.
McKeesport, PA 15134
(412) 461-8100

H

Holt Specialty Equpt. Inc.
 P. O. Box 99 Hwy. 41A S.
 Eagleville, TX 37060
 (615) 274-6660

I

Industrial Refuse Sales, Inc.
 P.O. Box 5075
 Lakeland, FL 33803
 (813) 665-6507

Industrial Services of America, Inc.
 7100 Grade Lane, P.O. Box 32428
 Louisville, KY 40232
 (502) 368-1661

International Compactors Inc.
 P.O. Box 277
 Trenton, MI 48183

K

K-PAC, Div. of Krause Corp.
 P.O. Box 2707
 Hutchinson, KS 67504-2707
 (316) 663-7722

Kohlman-Hill Inc.
 4241 Ravenswood
 Chicago, IL 60613
 (312) 929-6600

L

Lummus Development Corp.
 P.O. Box 2526
 Columbus, CA 31902-2526
 (404) 323-1081

M

MGM Services
 5847 San Felipe, Ste 3939
 Houston, TX 77057
 (713) 974-5656

Marathon Equpt. Co.
 Box 1798
 Vernon, AL 35592
 (205) 695-9105

May Fabricating Co., Inc.
 P.O. Box 1029
 Beeville, TX 78104-1029

McClain Industries, Inc.
 Box M
 Utica, MI 48087
 (313) 264-3611

P

Parker/M-E Systems
 P.O. Box 157
 Silver Lake, IN 46982
 (219) 352-2141

Peabody Galion
 Box 607
 Galion, OH 44833
 (419) 468-2120

Peerless Corp.
P.O. Box 447, 182 SW Boones Ferry Rd.
Tualatin, OR 97062

Piper Wast Products
P.O. Box 13008, 2672 Channel Ave.
Memphis, TX 38113
1-800-333-8202

Q

Quality Products Div.
5669 E. Cork St.
Kalamazoo, MI 49001

R

Rudco Products Inc.
114 E. Oak Rd., P.O. Box 705
Vineland, NJ 08360
(609) 691-0800

S

SCI Equpt. Corp.
82 Modular Ave.
Commack, NY 11725
(516) 543-1800

SP Industries, Inc.
2982 Jefferson Rd.
Hopkins, MI 49328
(616) 793-7183

Sebright Products Inc.
127 N. Water St.
Hopkins, MI 49328
(616) 793-7183

Stagg Equpt.
7337 Central Ave.
Riverside, CA 92504
(714) 354-5529

Steco, Inc.
P.O. Box 158
St. Clair, PA 17970
(717) 429-0220

T

TL Industries, Inc.
Hwy. 365 S., P.O. Box 1126
Conway, AR 72032
1-800-635-6780

U

Universal Handling Equpt. Co.
Box 3272 Station C., Hamilton
Ontario, Canada

V

Ver-Tech, Inc.
2892 Vicksburg Lane
Minneapolis, MN 55447
(612) 559-2590

W

Waco Products Inc.
P.O. Box 829
Troy, OH 45373
(513) 778-0883

Wittke Iron Works Co., Ltd.
1496 Brier Crescent NW Pk.
P.O. Box 1180, Medicine Hat
Albeta, Canada T1A 7H3
(403) 527-8806

SCALES

The following manufacturers provide mechanical or electronic scales for measuring refuse. The scale system may be ordered with a computer and associated software to record and manipulate the waste data.

A

Absco Scales
9807 Johnstown Rd.
New Albany, Oh 43054
(614) 855-9500

All American Cash Register
1365 S. Inkster Rd.
Inkster, MI 48141
(313) 561-4141

Automation Services Inc.
3167 Custer Dr.
Lexington, Ky 40517

C

CMI Weighing Eqpt. (A Div. of CMI Corp.)
P.O. Box 270180
Oklahoma City Ok 73137
1-800-468-5249

Cardinal Detecto Scale Co.
P.O. Box 151
Webb City, Mo 64870
(417) 673-4631

E

Ernst & Young
990 Wood Ave. S.
Iselin, NJ 08830
(201) 906-3258

Fairbanks Scales, (A Div. of Fairbanks, Inc.)
Dept. PWS 04-90
St. Johnsbury, VT 05819
(802) 748-5111

Information Systems, Inc.
Mill Centre, Ste. 210, 3000 Chestnut Ave.
Baltimore, MD 21211
(301) 366-9595

Lake Goodwin Scale Co., Inc.
14752 NE 95th Street
Redmond, WA 98052
(206) 869-5200

Masstron Scale Inc.
6600 Huntley Rd.
Columbus, OH 43229
(614) 436-3292

Phillippi-Hagenbuch, Inc.
7414 W. Plank Rd.
Peoria, IL 61604-5216
1-800-447-6464

Rice Lake Weighing Systems
Div of Rice Lake Bearing Inc.
230 W. Coleman St.
Rice Lake, WI 54868
(715) 234-9171

SI-Lodec
4611 S. 134th Place
Tukwila, WA 98168
(206) 244-6100

Stress-Tek, Inc.
13024 S.E. 72nd Pl.
Renton, WA 98059
1-800-237-0022

F

Fleet Specialities Co.
Box 4575
Thousand Oaks, CA 91359
(818) 340-8181

I

L

M

Mobile Computing Corp.
30 Centurian Dr., Ste. III
Unionville, Ontario, Canada, L3R 8B8
(416) 479-5757

P

Precision Scale Systems
P.O. Box 1108
Rogers, AR 72757
(501) 631-0287

R

S

Solid Waste Technologies, Inc.
50 Mt. Bethel Rd.
Warren, NJ 07060
1-800-548-9789

Structual Instrumentation
4611 S. 134th Pl.
Tukwila, WA 98168
(206) 244-6100

T

Thurman Scale Co.
1939 Refugee Rd.
Columbus, Oh 43207

Toledo Scale, Div Reliance Electric Co.
350 W. Wilson Bridge Rd.
Worthington, OH 43085

W

Weigh-Tronix
1000 Armstrong Dr.
Fairmont, MN 56031
(507) 238-4461

Wray-Tech Instruments
2711 B Curtiss St.
Downers Grove, IL 60515
(708) 397-5170

TRANSFER STATION EQUIPMENT

Complete Systems

The following equipment manufactures provide complete transfer station systems.

A

AGES Corp.
1151 S. Trooper Rd.
Norristown, PA 19403
(215) 666-7404

Accurate Industries, a Sudbury Co.
Box 451
Willimstown, NJ 08094
(609) 629-2800

Asea Brown Boveri Inc.
900 Long Ridge Rd.
Stamford, CT 06904
(203) 328-7719

B

Browning-Ferris Industries, Inc.
Box 3151
Houston, TX 77253
(713) 870-8100

C

Chambers Development Co., Inc.
10700 Frankstown Rd.
Pittsburgh, PA 15235
1-800-222-2107

"Cram-A-Lot" Solid Waste/Recycling Eqpt.
J.V. Mfg., Inc.
P.O. Box 229
Springdale, AR 72765-0229

D

Dempster Systems
a Subs of Krug Int'l, Eastern Division
P.O. Box 1388, 302 N. Sate St.
Toccoa, GA 30577
(404) 886-6556

4/1

H

Haul-All Equpt. Ltd.
4115 18th Ave., N., Lethbridge,
Alberta, Canada, T1H 5G1
(403) 328-7719

I

International Compactors, Inc.
P.O. Box 277
Trenton, MI 48183

K

Keith Mfg. Co.
P.O. Box 1
Madra, OR 97741-0001
(503) 475-3802

M

Marathon Equpt. Co.
Box 1798
Vernon, AI 35592
(205) 695-9105

McClain Industries, Inc.
Box M
Utica, MI 48087
(313) 264-3611

Mr. Garbage U.S.A. Inc.
Chinquapin Round Rd.
Annapolis, MD 21401
(301) 268-1144

P

Peabody Galion
Box 607
Galion, OH 44833
(419) 468-2120

Q

Quality Products Div.
5669 E. Cork St.
Kalamazoo, MI 49001

R

Ramey, Inc.
P.O. Box 888
Winchester, OR 97495
(503) 673-0651

S

SP Industries, Inc.
2982 Jefferson Rd.
Hopkins, MI 49328
(616) 703-3232

Steco, Inc.
P.O. Box 158
St. Clair, PA 17970
(717) 429-0202

TRANSFER LOADING EQUIPMENT

Push Pit Stations

The following manufacturers provide loading equipment by hydraulic mechanisms which take refuse and compact it into a transfer vehicle.

D

Dempster Systems, A Subs. of
Krug Int'l Eastern Div.
P.O. Box 1388, 302 Sage St.
Toccoa, GA 30577
(404) 886-6556

M

McClain Industries, Inc.
Box M
Utica, MI 48087
(313) 264-3611

P

Peabody Galion
Box 607
Galion, OH 44833
(419) 468-2120

S

Steco, Inc.
P.O. Box 158
St. Clair, PA 17970
(717) 429-0220

Conveyor Feed Stations

The following manufactures provide conveyor equipment (moving bottoms) that take

refuse from the collection vehicle to transfer vehicles either directly or through compactors.

A

ABB Raymond, Combustion Engineering Inc.
650 Warrenvill Rd.
Lisle, IL 60532
(708) 971-2500

American Pulverizer Co.
5540 W. Park
St. Louis, MO 63110
(314) 781-6100

B

Beaumont Birch Co.
P.O. Box 599, 3900 River Rd.
Pennsauken, NJ 08110
(609) 663-6440

Buschman Co.
10045 Int'l. Blvd.
Cincinnati, OH 45246
(513) 874-0788

C

**Capital Conveyor Systems Group,
Detroit Stoker Co.**
1501 E. First St.
Monroe, MI 48161
(313) 241-9500

Carrier Vibrating Equpt., Inc.
P.O. Box 37070
Louisville, KY 40233
(502) 969-3171

**Cobey Composter, Div. of
Eagle Crusher Co., Inc.**
4250 S.R. 309
Galion, OH 44833
(419) 468-2288

Conair Wor-Tex Corp.
Old Brandon Rd.
Hillsboro, TX 76645
(817) 582-5354

D

Dover Conveyor & Eqipt. Co.
P.O. Box 300
Midvale, OH 44653
(614) 922-9390

E

Eriez Magnetics
P.O. Box 10608
Erie, PA 16514
(814) 833-9881

F

FMC Corp., Material Handling Systems Div.
400 Highpoint Dr.
Chalfont, PA 18914
(215) 822-4300

Fairfield Service Co.
240 Boone Ave.
Marion, OH 43302
(614) 387-3335



G

General Kinematics Corp.
777 Lake Zurich Rd.
Barrington, IL 60010
(708) 381-2240

H

Heil Engineered Systems
Arbor Terrace II, Ste. 201
205 Bishops Way
Brookfield, WI 53005
(414) 789-5533

Hustler Conveyor Co.
4985 Fyler Ave.
St. Louis, Mo 63139
(314) 352-6000

K

Keith Mfg. Co.
P.O. Box 1
Madras, OR 97741-0001
(503) 475-3802

M

May Conveyor, Inc.
9918 York-Theta Dr.
Cleveland, OH 44133
(216) 237-2272

**Mayfran Int'l., A Subs. of
Phillips Industries**
Box 43038
Cleveland, OH 44143
(216) 461-4100

Montgomery Industries Int'l.
2017 Thelma St., P.O. Box 3687
Jacksonville, FL 32206
(904) 355-5671

N

New London Engineering
1700 Division St.
New London, WI 54961
(414) 982-4030

R

Rexnord Corp.
P.O. Box 2022
Milwaukee, WI 53201
(414) 643-2320

S

Simplicity Engineering Div.
Lukens General Industries, Inc.
212 S. Oak St.
Durand, MI 48429

Solid Waste Systems, Inc.
412 Harrison St.
Kalamazoo, MI 49007
(616) 344-0064

T

Tramco Inc.
1020 E. 19th St.
Wichita, KS 67214
(316) 264-4604

Transcon, Inc.
8824 Twinbrook Rd.
Mentor, OH 44060-4391
(216) 255-7600

Triple/S Dynamics, Inc.
1031 S. Haskell
Dallas, TX 75223
(214) 828-8600

W

Webb, Jervis B., Co.
World Headquarters, Webb Dr.
Farmington, Hills, MI 48331

Williams Patent Crusher & Pulverizer Co.
805 Montgomery St.
St. Louis, MO 53102
(314) 621-334

Transfer Hauling Equipment

The following manufacturers provide transfer hauling trailers. Trailers can be open or closed top. The type of loading operation will dictate the choice. Also the equipment must provide for unloading. Self contained ejectors can be provided or supplemented by mobile dumpers at the disposal site.

A

Accurate Industries, a Sudbury Co.
Box 451
Williamstown, NJ 08094
(609) 629-2800

American Carrier Equpt., Inc.
P.O. Box 2615
Fresno, CA 93745
(209) 442-1500

Atlas Refuse Equpt. Div of
Richier Hydraulics Inc.
7600 Cote De Liesse Rd.
Montreal, Quebec, H4T 1E9

B

Benlee Inc.
 750 S. Deacon St.
 Detroit, MI 48217
 (313) 842-8100

Bobdo Industries, Inc.
 1301 W. Culver Rd.
 Knox, IN 46534
 (219) 874-6261

Bocats Inc.
 Box 1021
 Garden City, KS 67846
 (316) 275-7167

Brothers Industries, Inc.
 Hwy. 59 S., P.O. Box 408
 Morris, MN 56267
 (612) 589-1971

C

Clement Industries
 P.O. Box 914
 Minden, LA 71058-0914
 (318) 377-2776

Columbia Trailer Co.
 999 NW. 231st
 Hillsboro, OR 97124
 (503) 640-4771

D

**Dempster Systems, a Subs. of
 Krug Int'l., Eastern Div.**
 P.O. Box 1388, 302 N. Sage
 Toccoa, GA 30577
 (404) 886-6556

E

East Mfg. Corp.
 1871 State Rte. 44
 P.O. Box 277
 Randolph, OH 44265
 (216) 325-9921

F

Fabrix Inc.
 9000 Industrial Blvd.
 Trois Rivieres, Quebec, Canada G9A 5E1
 (819) 379-3738

Florig Equpt. Co., Inc.
 906 Ridge Pike
 Conshohocken, PA 19428
 (215) 825-0900

G

Geneva Produces.
 675 12th Ave. S.E.
 Valley City, ND 58072
 1-800-328-7024

53

H

Hale Trailer
P.O. Box 14
Marlton, NJ 08053
(609) 768-1330

Hallco Mfg. Co. Inc.
P.O. Box 505
Tilamook, OR 97141
1-800-542-5526

J

J&J Truck Bodies & Trailers
A Div. of Somerset Welding & Steel, Inc.
RD #2, Box 234-1A
Comerset, PA 15501
(814) 443-2671

K

Keith Mfg. Co.
P.O. Box 1
Madras, OR 97741-0001
(503) 475-3802

L

Labrie Eqpnt. Lt.
175 Route Dupont, Saint-Nicholas
Quebec, Canada, G0S 2Z0
(418) 831-8250

Les Soudures Chagnon, Ltd.
580 Monte Ste-Julie, Barennes,
Quebec, Canada, J0L 2P0

Loadmaster Corp.
500 Hackney Ave.
Culpeper Air Park
P.O. Box 1006
Culpeper, VA 22701-1006

M

McClain Industires, Inc.
Box M
Utica, MI 48087
(313) 264-3611

Milwaukee Cylinder
Power Gear Div.
950 Green Valley Rd.
Beaver Dam, WI 53916
(414) 887-0317

N

New England Eqpnt. Sales & Service
180 Main St., P.O. Box 5527
Salisbury, MA 01952
(508) 465-2120

P

Peabody Galion
Box 607
Balion, OH 44833
(419) 468-2120

Peerless Mfg. Co.
U.S. 82 E., P.O. Box 245
Shellman, GA 31786
(912) 679-5353

R

Ravens Metal Products, Inc.
P.O. Box 1168
Parkersburg, WV 26102-1168
(304) 275-4247

S

SP Industries, Inc.
2982 Jefferson Rd.
Hopkins, MI 49328
(616) 793-3232

Steco, Inc.
P.O. Box 158
St. Clair, PA 17970
(717) 429-0220

T

Trailstar Mfg. Corp.
20700 Harrisburg/Westville Rd.
P.O. Box 3820
Alliance, Oh 44601
(216) 821-9900

Travis Body & Trailer, Inc.
13055 FM 529
Houston, TX 77041
1-800-535-4321

U

Universal Handling Eqpt. Co.
Box 3272, Station C., Hamilton
Ontario, Canada

W

Wesco Trailer Sales
1960 E. Main St.
Woodland, CA 95695
(916) 662-9606

Wilkens Mfg., Inc.
RR2, Box 46A
Osborne, KS 67473
(913) 346-2041

Y

Young Eqpt.
16765 SE 362nd Ave.
P.O. Box 1117
Sandy, OR 97055

V. Financial Planning and Assistance

The selection and specification of solid waste equipment are important to operating efficient and effective solid waste facilities. Without adequate financial means neither the purchase nor proper use of this equipment can be realized. This section discusses the financial requirements for solid waste management and suggests some ways to meet them.

Revenue Planning

Regardless of what methods an organization chooses to finance its capital equipment needs, an adequate and reliable revenue source must first be secured. This is important, even if, the organization is receiving grants for capital equipment purchases. To determine revenue needs adequate cost data are required. These costs can be projected only if the organization has a well thought-out plan which details the organization's capital and operating revenue needs. This plan will not only enable the organization to forecast current revenue needs but also assure revenue reserves for future purchases and replacements. Another important part of this plan is generating adequate revenue to operate and maintain the equipment purchased. Failure to provide adequate funds for well trained operators, equipment operating expenses and comprehensive maintenance will result in equipment failure and non-production thereby undermining prior efforts to select the best equipment.

Once the organization has determined its revenue needs it must be able to project these costs on a unit basis to the customer it serves. This applies to both public and private operations. From this unit cost the organization can set a fee or a tax rate to generate the necessary revenues. In choosing a tax or fee the solid waste organization must look to the political body responsible for making this choice. The solid waste organization must demonstrate the revenue need based on sound planning and efficient operation reflected in the previous paragraph. The political body then must choose which revenue method is best for its locale based on some form of equity system. While these revenue system choices are vital, they are beyond the scope of this publication.¹ In conclusion, a stable revenue base is essential to both the operations and capital purchasing capabilities of the solid waste organization.

Financial Mechanisms

The next step in financing equipment purchase is choosing a method. Financing methods directly relate to the ability of the solid waste organization to raise revenue and how costs are passed on to the customer. The choices are raising cash or financing the purchase with accompanying financing charges. A cash purchase could require a one time customer rate increase, a government grant or a capitol fund built up over time within the customer rate structure. Even though the purchase is made with cash, proper financial planning still dictates funding for replacement or depreciation of the equipment.

¹ If you would like further information about setting the tax rate or fee and working with local government officials, please contact ICMA.

Should the organization choose to finance a purchase there are several alternatives. One option is borrowing money from a financial institution. This entails securing a loan or the issuing of some form of short-term certificate of debt by a political body. Because operating equipment has a life-span of approximately ten years, long-term financing is usually discouraged. Therefore, the term of the debt instrument should reflect the expected life of the equipment. Often the financial institution may require the solid waste organization to set-up and demonstrate funding of the debt plus maintenance of the equipment. This demand protects the financial institution's asset and supports the solid waste organization's need for operating and maintaining the equipment.

The previous discussion refers to the purchase of new equipment. But several companies and municipalities also have used-equipment available for purchase. The purchase price is usually based on the age, condition and salvage-price paid by the buyer. For many communities this is a more economical way to obtain needed equipment. Used equipment is usually purchased with cash or through the receipt of a financial grant. In order to inquire about equipment availability you can contact equipment manufacturers in this publication, solid waste trade magazines, large United States cities or equipment brokers such as the ones listed below:

Davis Truck and Equipment Co. of San Antonio
4300 Hwy. 90E
San Antonio, TX 78220
(512) 333-5570
Fax: (512) 333-2217

Trucks & Parts of Tampa, Inc.
1015 S. 50th St.
Tampa, FL 33619
(813) 247-6636

In choosing to purchase used equipment, the solid waste organization must take care to determine its age, condition and, if possible, maintenance record. Additionally

it is important to know what has been done to restore the equipment before it was sold; what are the maintenance requirements of the equipment; where can replacement parts be obtained and how rapidly; and who can perform the maintenance locally should the organization choose to contract the work. The solid waste organization must be prepared to maintain the equipment and establish back-up capability since downtime can be expected.

Another alternative when purchasing used equipment is to inspect the equipment before it is purchased and assess what refurbishing would be necessary to obtain a reasonable extended life. The solid waste organization would then contract for this refurbishing and require the contractor to make available spare parts or continue with a limited maintenance agreement. This method allows the solid waste organization to control the work, pay only for what is cost-effective and insure parts and maintenance capability.

The choice to deal with used equipment involves great deal of risk. Even when using a good plan with plenty of checks and balances this cannot guarantee that the equipment will not experience a major failure. The possibility of equipment failure is presumably at least one of the reasons why the original owner sold the equipment. The purchase and discussion of the refurbishing of used equipment should be done on an individual basis of equipment experience. The solid waste organization must research and study the used equipment broker's track record. When dealing with equipment manufacturers, the solid waste organization must also understand that the manufacturers are most interested in selling new equipment therefore persistence is

necessary.

Another form of equipment purchase is lease purchasing. In this case the solid waste organization would lease the equipment by paying a lease fee of which a percentage would be applied toward purchase of the equipment. The title of the equipment remains with the leasing agency until the purchase price is reached. The leasing agency again may require the operating organization to set some maintenance fund but normally the equipment maintenance is built into the lease price. Many organizations favor this method since it reduces the immediate requirements for raising additional reserve funds to insure a loan as well as maintenance facilities for the equipment. However, the lease fees are high since the lessor is paying the leasing company for its risk and profit in this venture. Also the solid waste organization still faces the maintenance and replacement cost once the purchase price has been reached. This financing approach requires financial and operational discipline to replace the equipment in a timely manner. Often after the equipment is purchased there is a temptation to extend its life or use it beyond its projected life.

Leasing equipment is another option for acquiring needed equipment. Leasing is similar to a lease purchase except the solid waste organization has no asset in the equipment and can be subject to rate increases if the lease agreement is not properly negotiated. The lease agreement usually includes a method of equipment maintenance provided by the leasing agency. The leasing agency may also require that agency's equipment operator be utilized. This may cause operational management problems. If the solid waste organization operates the equipment,

disagreements often arise over who will pay for equipment repairs which are needed due to equipment failure or abuse. A carefully prepared agreement must be in place before the lease occurs otherwise the solid waste organization could incur substantial costs in addition to the lease payment. The solid waste organization must carefully study the maintenance work to be performed under the contract. Also, should the equipment fail to operate, the solid waste organization must provide in the contract for substitute equipment since solid waste is generated daily and must be handled accordingly.

Leasing or lease purchase are viable financial methods for obtaining equipment. However, the solid waste organization is paying a premium for the purchase, finance and maintenance of the equipment. The solid waste organization must analyze these costs and compare them to the costs of cash or debit financing methods. This cost comparison must include purchase price, financing charges, replacement reserve funds, insurance, maintenance and repair and profit. The solid waste organization's overhead and facilities needed to perform maintenance by the solid waste organization must be factored into this cost analysis. Once this cost analysis is performed, the solid waste organization must assess the benefits and risks of maintaining and owning its equipment. Based upon this analysis an equipment financing scheme will be selected and followed. It is not necessary that a single method be used. A combination of methods may be chosen based upon revenue raising methods and a desire to own certain critical equipment and lease back-up or occasional-use equipment.

Financial Assistance Mechanisms

In many communities addressing solid waste needs is very demanding. Establishing financial methods and purchasing mechanisms is difficult and costly unless the expertise and experience already exists. For communities who choose to establish and operate their own solid waste management system there are means to seek help in purchasing and financial assistance. The United States Agency for International Development (U.S.A.I.D.) has been providing this type of technical assistance to local governments. The agency can provide independent agency contractors to act as technical advisors in all aspects of equipment selection, specifications, preparation and financial planning for solid waste management. These contractors can advise, help analyze and train the solid waste organization's staff regarding all aspects of equipment purchasing and financing discussed in this publication. Upon completion of the assignment, the solid waste organization should have gained the necessary hands-on knowledge and experience to continue sound financial practices tempered by local governmental and political realities.

Another means of obtaining help in this purchasing and financial process is to visit with manufacturers. Most of the major manufacturers of solid waste equipment have developed international service divisions or departments and have set-up companies in many countries. These companies have specialized in securing financing or leasing arrangements that meet each country's requirements, international lending institution requirements and lease funding capabilities. This expertise is available since it benefits the company in international equipment sales. Of course, contacting

several companies to compare their services and obtain information is important. If you choose to use this expertise in the purchasing process, you must use it as a stipulation of the purchasing specification.

Working with the manufacturer links the financing and purchasing processes. The concern is whether the best services are being obtained as well as how much must be paid for the service. Also care must be taken that the organization is not forever bound to the particular brand of equipment being purchased, because there is no guarantee of any company's quality or long-term viability. The solid waste organization must carefully examine the demands for financial reserves and maintenance funding because any risk assumed by the equipment manufacturer in this transaction will be paid for by the purchaser. The best way to gain from the manufacturer's expertise is to utilize the manufacturer as a consultant in making financial arrangements with the solid waste organization. At the same time "due diligence" must be practiced to investigate and ensure the desirability of any suggested arrangement by the manufacturer.

Many U.S. cities are very involved with or interested in being involved with foreign countries. The motivation for this involvement is to promote trade and economic development of the U.S. city and help local and foreign communities improve their municipal operations. Many U.S. cities have "sister city" arrangements with foreign cities. Both cities agree to promote mutual economic development interest, cultural exchanges and technical assistance. Under this arrangement the foreign "sister city" can usually draw upon the municipal expertise of its U.S. partner

in the area of purchasing assistance, financial planning and the possible purchase of used equipment. Taking advantage of the U.S. city's help does have limits because the assistance must come from city staff which already has responsibilities, unless other arrangements are made. Also, many of the staff experts are not familiar with all of the requirements, regulations and political limitations of the solid waste organization so their advice must be put into context in order to apply to the local situation.

In purchasing or obtaining at "no cost," used equipment from a "sister city" one must follow the same guidelines and heed the same warnings as with the outside purchase of used equipment. This may present difficulties since this purchase must be treated as a business relationship and not one of friendship. The solid waste organization must approve such an arrangement by determining the usefulness of the equipment and its operational capabilities. Do not accept equipment as a gift unless it fits into the operational plan.

The second method of using a relationship with a U.S. city is in a "twinning concept." The local solid waste organization of a country would pay for the services of a U.S. city to purchase and help finance the purchase of equipment. The U.S. city would then arrange to have the equipment shipped to the foreign city. Obviously the U.S. city must be interested and have the capability and location to take advantage of shipping or exporting rates favorable to the foreign country. This approach could apply to purchase of new or used equipment.

When using this mechanism, agreements need to be reached on services to be

provided, financial transfer, export licenses, liability and insurance coverage. Hopefully the local foreign government would benefit from this practice by using the program as a training program for its staff. The advantages of this process are that technical expertise is used to obtain the best possible equipment, the purchasing mechanism already established can be used and staff becomes trained for future arrangements. Again it is important to remember that this approach must be viewed as a business relationship.

For further information regarding potential "sister city" relationships or U.S. cities interested in participating in a twinning operation contact the International City/County Managers Association (ICMA) at:

**I. C. M. A.
777 North Capitol St., NE #500
Washington, DC 20002-4201
Tele: (202) 962-3667
Fax: (202) 962-3500**