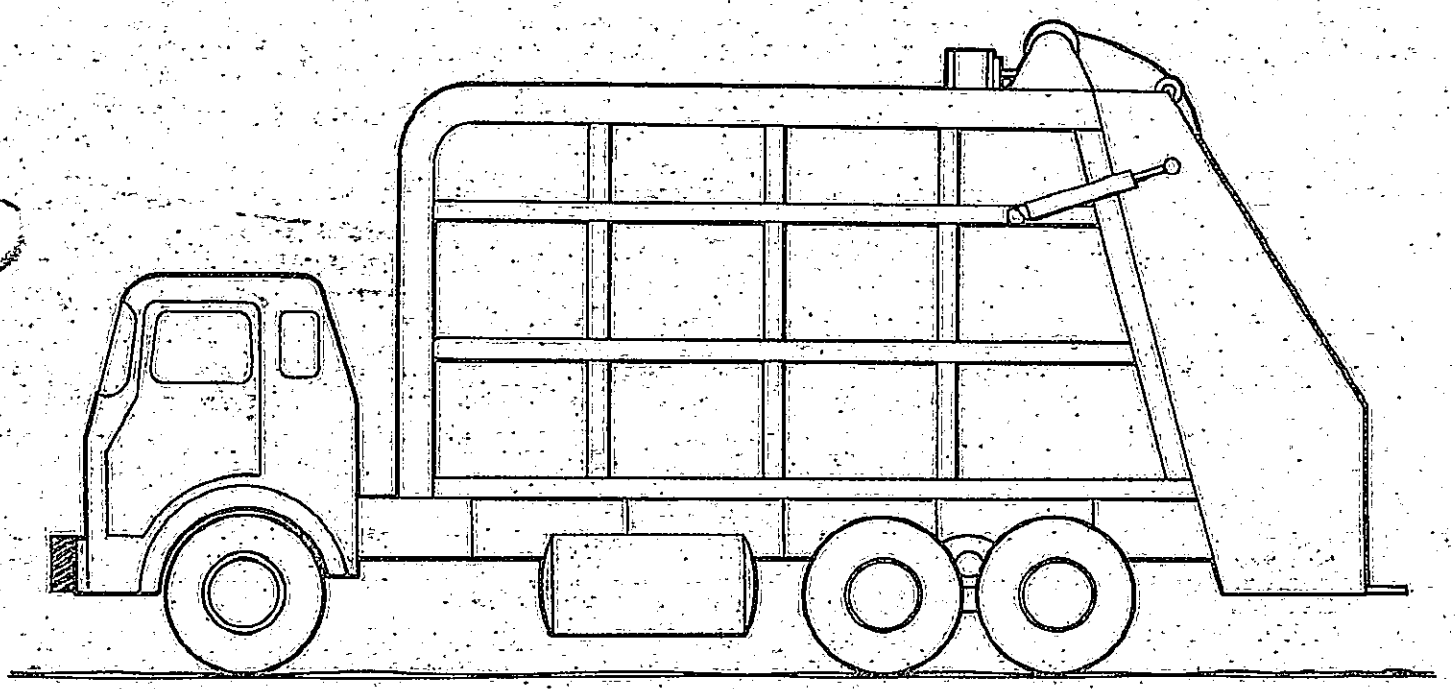
Buy Quiet

PRODUCT INFORMATION SUPPLEMENT No. 3
PRODUCT NOISE INFORMATION SERIES
JUNE, 1980

INFORMATION ON NOISE LEVELS, NOISE MEASUREMENT METHODS AND "BUY QUIET" EXPERIENCES ASSOCIATED WITH TRASH COMPACTORS



AN INFORMATION SUPPLEMENT FOR GOVERNMENTAL PURCHASING AGENTS IN DEVELOPING "BUY QUIET" PROGRAMS

THE NATIONAL INSTITUTE
OF
GOVERNMENTAL PURCHASING
1001 CONNECTICUT AVE. N.W.
WASHINGTON, D.C. 20036

Preface

This packet contains information for the use of government purchasing officers and other officials in purchasing quieter trash compactors. It is a companion document to the Guide to Purchasing Quieter Products and Services[1] which describes in general terms how noise considerations can be incorporated into purchasing decisions. Together, these documents and others available through the Quiet Product Data Bank maintained by the National Institute of Governmental Purchasing (NIGP) can help you develop a "Buy Quiet" Program for your government.

1. Issued by NIGP, May 1980.

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INTRODUCTION

The "Buy Quiet" Program is a new concept in which governments cooperate with each other to buy quiet models of equipment. It is being extended with the help of the National Institute of Governmental Purchasing, the National League of Cities, other national organizations and various local and state agencies. This type of local noise control:

- costs very little;
- requires little additional effort;
- begins the community quieting process;
- establishes market pressures.

Surveys have shown that noise is the most frequently identified undesirable neighborhood condition in urban areas. Scientists and the medical profession now tell us that noise is no longer a mere irritant, but that in fact it has a very adverse impact on our health and well being. You as a purchasing officer can reduce noise in your community by purchasing quieter products. State and local governments and large private organizations spend billions of dollars each year on equipment such as compactors, chain saws, typewriters, lawnmowers, trucks, motorcycles, pneumatic drills, and buses. If these governments can become more selective so as to purchase quieter products, cities and neighborhoods will be quieter.

Section 1. DESCRIPTION OF THE PRODUCT

A trash truck, which is formally designated as a truck-mounted solid waste compactor, consists of a truck chassis and a compactor body. The compactor body is equipped to receive, compact, transport, and unload solid wastes.

The major compactor body types are operationally classified herein by the body loading configuration:

1. Front Loaders. These bodies utilize front mounted hydraulic lift arms to lift and dump waste containers into an access door located on the top of the compactor body. Packer plates compact the wastes inside the body. Wastes are usually ejected through a tailgate. Front loaders are essentially all mounted on a heavy duty truck chassis powered by a diesel engine, and are used predominantly in commercial and industrial applications. A typical front loader and its operational techniques in loading and compacting is illustrated in Figures 1.a, 2, and 3.

2. Side Loaders. Considerable variation exists in these compactor bodies. Generally, however, wastes are manually deposited into a hopper through an access door in the side wall of the body. Packer plates sweep the wastes from the hopper into the body and compress the materials against an interior wall in the same manner as the front loaders (Figure 3). Some side loaders are also equipped to hydraulically lift and dump waste containers. Ejection of wastes is usually through a tailgate. Many side loader models are not equipped for packer ejection, but typically will hydraulically lift the front end of the body and dump the wastes through a tailgate. Side loaders can be mounted on a light, medium, or heavy duty truck chassis. They are used predominantly for residential waste collection. A typical side loader model is illustrated in Figure 1.b.

3. Rear Loaders. The hopper on these compactor bodies is located on the rear section of the body (see Figure 1.c.). Wastes are generally loaded manually into the hopper, but some models have the capability to hydraulically lift and dump containers; the packer plate sweeps the wastes from the hopper into the body and compresses the wastes against an interior wall surface. In most models, the packer plate is also used for tailgate waste ejection. Rear

loaders are typically mounted on medium or heavy duty truck chassis and are used principally for residential waste collection.

Two additional categories of solid waste compactors are manufactured:

1. Satellite Vehicles. These compactor bodies function much like other packers, but are relatively small. They are used in door-to-door waste collection and in conjunction with a larger packer turck. The satellite vehicle body ejects wastes into the hopper of a larger packer truck or serves as a detachable container which is lifted and dumped by a larger truck. These bodies were excluded from consideration because available information indicated they were not a significant source of noise.

2. Route Trailers. These solid waste compactors are pulled by a truck rather than being mounted on the truck chassis. Operation of the unit is similar to a side loader, except the trailers are powered by a stand-alone auxiliary engine mounted on the trailer. Fewer than 50 units were shipped in 1974 and the estimated number of units in operation in the U.S. as of today is less than 100.

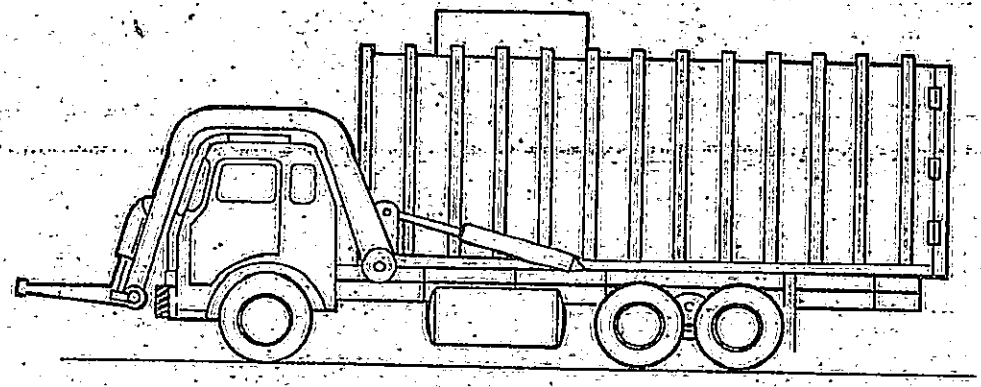


FIGURE 1.a
A FRONT LOADER

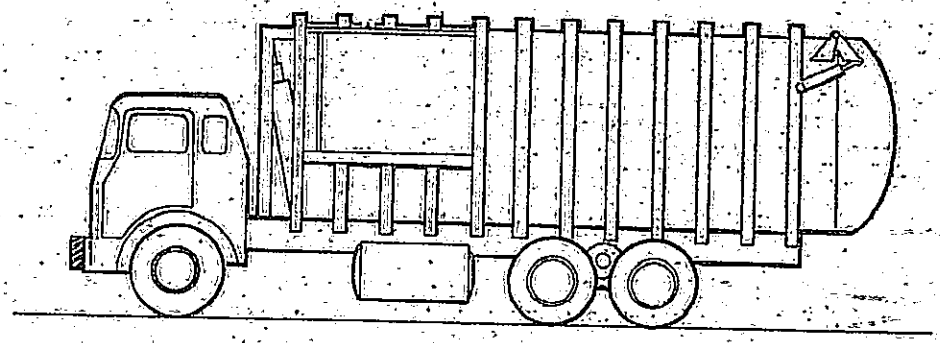


FIGURE 1.b.
A SIDE LOADER

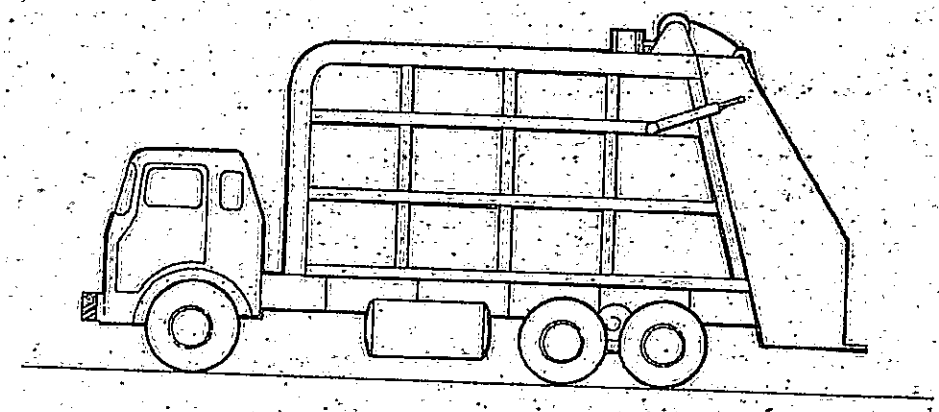
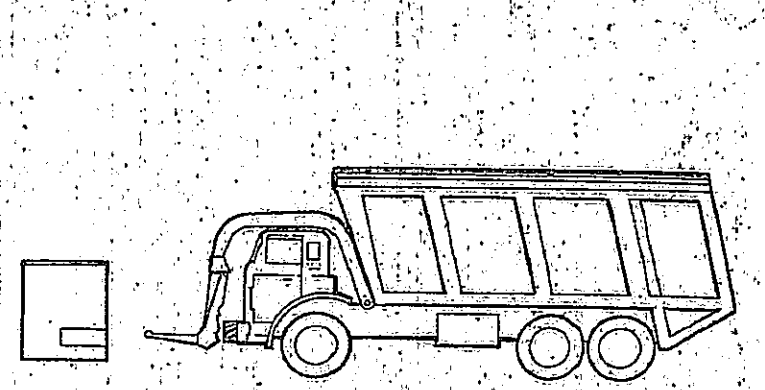
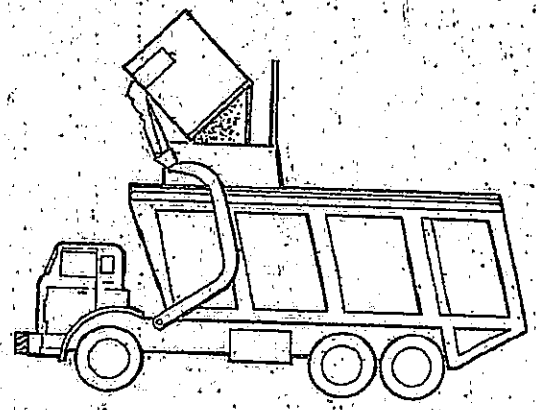


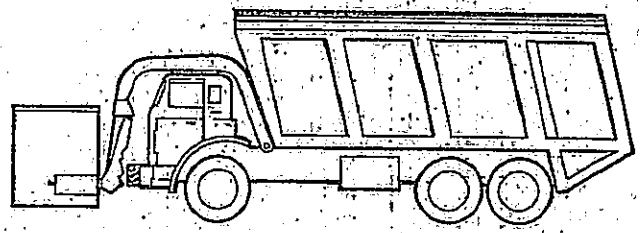
FIGURE 1.c.
A REAR LOADER



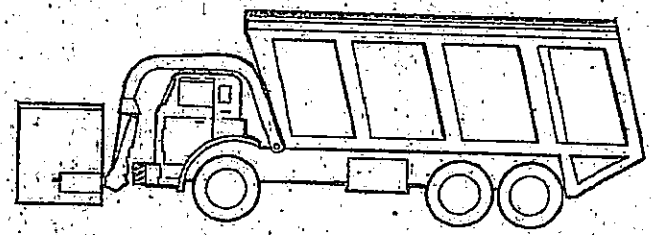
APPROACH



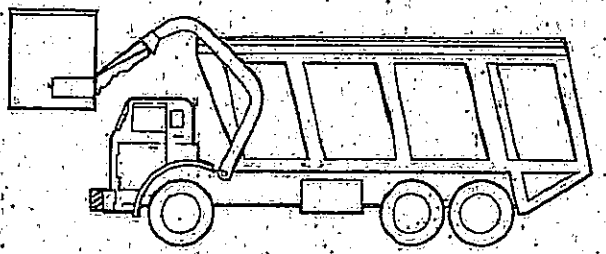
DUMP



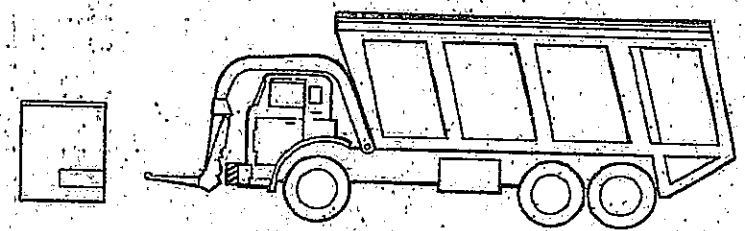
ENGAGE



REPLACE



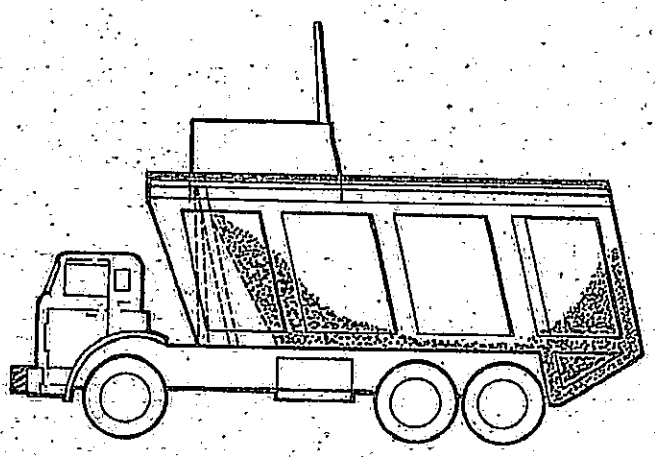
LIFT



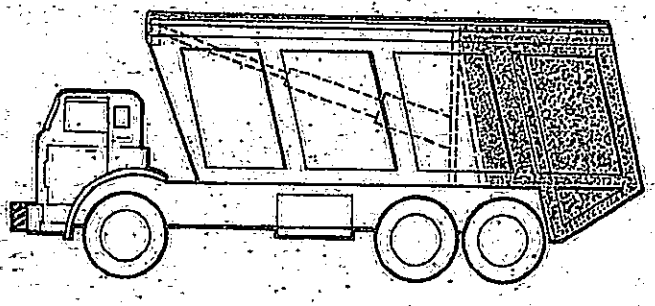
DISENGAGE

FIGURE 2

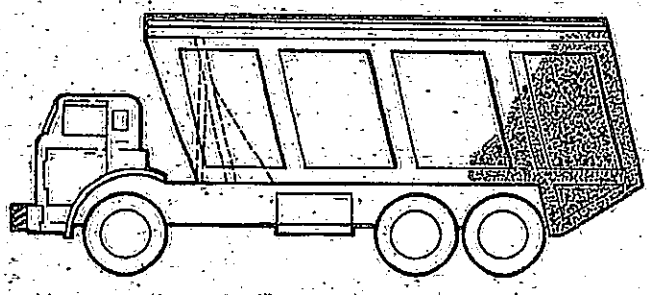
SIX STEP OPERATIONAL SEQUENCE FOR FRONT LOADING



DUMP



COMPACTION



RETURN

FIGURE 3

OPERATION OF A FRONT LOADER (COMPACTION CYCLE)

Section 2. NOISE LEVEL OUTPUT INFORMATION

Definitions of Terms

NOISE: Any undesired sound.

SOUND LEVEL METER: An instrument, consisting of a microphone, an amplifier, an output meter, and frequency-weighted networks, that is used for the measurement of sound levels in a specified manner.

DECIBEL: The intensity of a sound often abbreviated dB. The decibel scale was devised to measure the smallest difference in sound which is detectable by the human ear. Its graduations move up not in a simple arithmetic progression but in a multiple progression based on logarithmic calculations. This means that each increase of one decibel represents a much larger change of intensity than might be expected. Because of the logarithmic progression of the decibel scale, an increase of ten decibels, for example, reflects a ten-fold increase in sound energy, but is perceived as being approximately twice as loud. Thus a sound which is measured at 80 dB contains ten times the sound output and is perceived as being twice as loud as a sound that is measured at 70 dB.

dBA: An expression of sound level taking into account the response of the human ear to sound.

Noise level information is given in Table 1. When using it, please note:

1) the noise level range given for commercially available models of the product is for use as a guide only. It is not a definitive statement of noise measurements taken on all models currently available. Lower noise levels, for some models, are likely to be found.

2) when making comparisons among the noise levels of different products, it is very important that a single noise measurement method[1] is used. If this is not adhered to, very different noise levels will result and comparisons which are made may not be meaningful. Thus, in the chart the range of noise levels is expressed using one method from the known ones that are listed, to insure consistency when comparing noise level information. Selection of that particular method in no way constitutes NIGP endorsement of that method.

3) the table implies nothing in terms of product pricing. A quieter product does not necessarily cost more; in many cases, it may be less.

Measurement Procedures

Sound level measurement procedures generally prescribe instrumentation (e.g., the type of sound level meter to be used, other devices required), a description of the test site and measurement zone, a description of equipment operation (e.g. traveling on stationary mode, rpm setting), how measurements are to be made (e.g., setting of sound level meter, height and location of microphones), and general requirements (e.g., such as who should select testing equipment and conduct the tests).

1. See discussion in Section 3.

TABLE 1. TRASH COMPACTOR

NOISE DATA SUMMARY

CATEGORY	APPROPRIATE RANGE OF NOISE LEVELS FOR ALL CATEGORIES AT 7 METERS (EPA METHOD)	NOISE[2] MEASUREMENT METHODS
All Vehicles[1] Rear Loaders Front Loaders Side Loaders	74 dBA - 79 dBA	U.S. EPA noise Measurement Methodology for TRASH compactors

1. The U.S. EPA maximum level of 79dBA that manufacturers are required to meet as of 10/1/80 was used as the upper limit of the range; as of 1982, the EPA maximum level will be 76dBA.
2. Copies available through NIGP.

Section 3. PREPARATION OF THE PRODUCT SPECIFICATION

A good specification for any product will identify minimum performance and design requirements; list the reproducible test methods that may be used to determine compliance with these requirements; allow competitive bidding; permit an equitable contract award at the lowest possible evaluated price.

Therefore, a government seeking to purchase a quieter product should be sure that its specification describes a product that can be bid at a reasonable price by at least two, and preferably, three or more suppliers.

Noise Level Specification

The noise level portion of the product specification should contain the following three elements.

1. A maximum noise level referenced to a single measurement methodology.
2. A verification requirement, and
3. An incentive for offering products quieter than the maximum level established.

Maximum Noise Level

The maximum level should be low enough to disqualify the noisiest models on the market but high enough to insure competition among 2 or more suppliers.

Including Sound Level Measurement Procedures in the Specifications

A buyer must reference a reproducible sound level measurement procedure whenever it specifies a noise level requirement or any other performance requirement. For example, the noise level requirement in a specification for a quieter trash compactor might say:

> NOISE LEVEL: Noise level shall not exceed __ decibels (A Scale) when measured in accordance with the U.S. E.P.A. noise measurement methodology for trash compactors.

A copy of the complete specification for trash compactors will be available in the near future from NIGP.

Verifying Compliance With Specifications

There are at least two ways that governments can assure themselves that they have been offered or sold products which conform to specified requirements. One involves laboratory and field testing. The other involves vendor submission of "certified" test data.

In some instances, it may be necessary for the government or its agent (e.g., a commercial laboratory) to actually test items when they are submitted for evaluation or when received after purchase. In most instances, however, it is more practical for the government to ask for a written certification that the vendor's product conforms with a specified requirement. There are hundreds of private sector laboratories which could be approved to perform testing and certification services for manufacturers.

If a buyer must actually test the noise levels of product models offered in response to a "noise-conscious" invitation for bids, he or she should contact the Buy Quiet Program director at NIGP for assistance, who may be able to arrange for essential testing through various cooperative programs.

Section 4. A SUGGESTED METHOD OF CONTRACT AWARD

NIGP has developed an optimal method of contract award which allows a buyer to encourage a bidder to offer a product that is even quieter than required by the specification. In effect, it tells the bidder: "For each decibel[1] that your product is quieter than the loudest product bid (in conformance with the specification), we will subtract a fixed percentage of the average actual bid price from your actual bid price. The difference will be your evaluated bid price."

Evaluated bid prices, rather than actual bid prices, are compared in the selection of the contract recipient. As in Life Cycle Costing, the bidder with the lowest actual bid price may not necessarily be the bidder with the lowest "evaluated" bid price.

To insure against paying an excessive premium for increased quietness, buyers using this optimal method of contract award can state:

> The purchaser will not pay a contract price more than X% in total above the average of the actual bid prices.[2] This amount represents the maximum additional amount that the government is willing to pay above the average actual bid price, for each quieter product.

1. Usually (but not always) A scale. A few product methodologies may use the C scale.
2. Not to be confused with the per decibel incentive in the formula.

Formula For Determining Evaluated Bid Price

The formula for determining the Evaluated Bid Price (EBP) is:

$EBP = P - Y\% (P_{AV}) (N_N - N)$ where:

EBP = Evaluated Bid Price

P = Actual Bid Price

Y% = The percentage weight designated by the purchasing activity to "reward" the bidder for each decibel that his model is quieter than the noisier model bids.

P_{AV} = Average (actual) bid price of all models bid in response to the IFB

N_N = The noise level (in decibels) of the noisiest model bid in response to the IFB

N = The noise level (in decibels) of the model whose EBP is being determined

Sample Bid Tabulations

In order to illustrate the working of the formula, the bid tabulations for a purchase of quieter product X might look like this:

BIDDERS:

Bidder	Actual Bid Price	Noise Level (dBA)	(EBP) Evaluated Bid Price:
(A) Smith Co.	$145.00	76	$145.00
(B) Robert Co.	$154.00	75	$151.02
(C) Jones Co.	$147.00	72	$135.08
(D) Watkins Co.	$150.00	71	$135.10

Calculation of Evaluated Bid Price (EBP)

Assuming that the Purchasing Activity used a 2% "reward" factor for each decibel of increased quietness, the EBP for each bidder would be determined as follows:

(A) Smith Co.
EBP = $145. - .02 ($149) (76-76)
= $145. - $2.98 (0)
= $145.

(B) Roberts Co.
EBP = $154. - .02 ($149) (76-75)
= $154. - $2.98 (1)
= $151.02

Calculation of Evaluated Bid Price (EBP) con't.

(C) Jones Co.
EBP = $147. - .02 ($149) (76-72)
= $147. - $2.98 (4)
= $147. - $11.92
= $135.08

(B) Watkins Co.
EBP = $150. - .02 ($149) (76-71)
= $150. - $2.98 (5)
= $150. - $14.90
= $135.10

Contract Award.

Based on an evaluated bid price (EBP) of $135.08, the contract should be awarded to Jones Co. (bidder "C") at its actual bid price of $147 per unit for furnishing quieter product X with a (maximum) noise level of 72 decibels (A Scale).

APPENDIX A

TRASH COMPACTOR MANUFACTURERS

Mr. T.L. Woolard
President
Combustion Engineering, Inc.
Air Preheater Co., Inc.
Andover Road
Wellsville, NY 14895

Mr. James Dempster
President
Dempster Brothers
Spring Dale Avenue &
Southern Railway
Knoxville, TN 37917

Mr. George W. Bartlett
Neway Division
Lear Siegler Ind.
1950 Industrial Blvd.
Muskegon, MI 49443

Mr. Ken McClain
President
McClain Industries, Inc.
40730 Mound Road
Utica, MI 48087

Mr. Stan Worthington
President
Wayne Engineering Corp.
2412 West 27th Street
Cedar Falls, IA 50613

Mr. John Hagan
President
City Tank Corp.
Hagan Industries, Inc.
Brandy Road
10 Box 711
Culpepper, VA 27701

Mr. Lyle E. Yost
Chairman and President
Hesston Corporation
P.O. Box 788

Mr. David Leach
President
Leach Company
222 West Adams Street
Chicago, IL 60606

Mr. Max J. Lugash
President
Maxen Industries, Inc.
1960 East Slauson Blvd.
Huntington Park, CA
90255

Mr. Henry D'Amato
Union Corporation
Union Environmental Div.
401 Bridge Street
Old Forge, PA 18518

Mr. Don Peterson
General Manager
Gatwood Div. of
Sargent Industries
P.O. Box 870
Enterprise, AL 36330

Mr. Lee Kabbaz
President
Perfection Coby Co.
South East Street
Galion, OH 44833

Mr. Paul Williams
President
Helix Corporation
1503 North Main
P.O. Box 289
Crown Point, IN 49801

Mr. Bon Giozanni
President
Peabody Solid Waste
Management Co.
P.O. Box 607
Gailon, OH 44833

Mr. Harold L. Cole, Sr.
President
Truxmore Industrie,
Incorporated
6th & Dimwiddle Sts.
P.O. Box 4385
Richmond, VA 23224

N.N. Moon
Trailer Body Builders
1602 Harold Street
Houston, TX 77006

Mr. Frank Palopoli
President
Sanitary Controls, Inc.
82 Modular Avenue
Commack, NY 11725

Mr. Norton Cahr
President
MARCIO, Inc.
P.O. Box 29506
2625 Freewood Drive
Dallas, TX 75229

Mr. Robert K. Butler
General Manager
Ebeling Manufacturing Corp.
P.O. Box 47
Plainview, TX 79072

Mr. Charles Ebbing
Carrier Corporation
Carrier Parkway
Syracuse, NY

Mr. John E. Arpe
President
The Hell Co.
3000 West Montana St.
Milwaukee, WI 53201

President
New Way Manufacturing Co.
600 NE 48th Place
Des Moines, IA 60113

President
Pak-Mor Manufacturing Co.
1123 SE Military Drive
P.O. Box 14147
San Antonio, TX 78214

TRASH COMPACTOR MANUFACTURERS CONTINUED

President
EMCO
P.O. Box 1747
Plainview, TX 79072

President
Haul-All
P.O. Box 2184
Kansas City, KS 66110

President
Accurate Industries, Inc.
P.O. Box 451
New Brooklyn Road &
Filbert Street
Williamstown, NJ 08094

President
Canadian Disposal Equipment
150 Strafford Avenue
Wayne, PA 19087

President
Clement Industries
P.O. Box 914
Minden, LA 71055

President
Converto Manufacturing
Division Cego, Inc.
Cambridge City, IN 47327

President
Galbreath
P.O. Box 226
Winamac, IN 49966

President
March Manufacturing
Products
4660 B Hickmore
Montreal H4T 1K2 Quebec

President
SCI Equipment Corp.
87 Modillar Avenue
Commack, NY 11725

President
Tri Pak Systems
Louisville, KY 40221

President
Uhrder, Inc.
Sugarcrest, OH 44681

Gary Lane
Universal Handling
Equipment
100 Burland Crescent
Hamilton 27, Ontario

June, 1980

APPENDIX B

GOVERNMENTS KNOWN TO HAVE HAD BUY QUIET EXPERIENCES ASSOCIATED WITH TRASH COMPACTORS

The Buy Quiet concept is new and the program is just starting. It should not be surprising, therefore, that only a few governments are known to have had such experiences. As more governments find the concept worthy and practical, this list can be expected to grow:

Government	Contact/Phone Number
El Segundo, California	Robert W. Gambrel/(216)322-4670 X241
Sacramento County, California	A. P. Reshke/(916)366-2034

This list will be updated on a regular basis.

APPENDIX C

SOURCES OF ADDITIONAL INFORMATION

Information on any aspect of the Buy Quiet Program is available from:

Director
Buy Quiet Program
National Institute of
Governmental Purchasing, Inc.
1001 Connecticut Avenue, N.W.
Suite 922
Washington, DC 20036
Tel: 202/331-1357

For additional information on technical and programmatic matters relating to product noise, you may wish to contact your local or state noise control official.