CITY OF SEATTLE
Department of Engineering

SOLID WASTE UTILITY

WASTE STREAM COMPOSITION STUDY 1988-1989

Final Report
June 1989

prepared by:
THE
MATRIX MANAGEMENT GROUP

CITY OF SEATTLE
DEPARTMENT OF ENGINEERING
SOLID WASTE UTILITY

1988/1989

WASTE STREAM COMPOSITION STUDY

FINAL REPORT

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CITY OF SEATTLE
SOLID WASTE UTILITY

WASTE STREAM COMPOSITION STUDY

FINAL REPORT

TABLE OF CONTENTS

		Page
I.	GENERAL BACKGROUND	
	A. INTRODUCTION TO THIS REPORT	1
	B. OVERVIEW OF THE WASTE COMPOSITION STUDY	1
II.	SUMMARY OF FINDINGS: TOTAL DISPOSED WASTE	3
III.	TERMINOLOGY AND DEFINITIONS	
	A. SUBSTREAMS	9
	B. WASTE COMPONENT CATEGORIES	9
	C. DEMOGRAPHIC DATA	12
	D. COMPOSITION CALCULATIONS	12
IV.	THE RESIDENTIAL WASTE STREAM	
	A. COMPOSITION	15
	B. QUANTITY	16
	C. POINT OF SAMPLING	17
V.	THE SELF-HAUL WASTE STREAM	
	A. COMPOSITION	31
	B. QUANTITY	32
	C. POINT OF SAMPLING	34
VI.	THE COMMERCIAL WASTE STREAM	
	A. COMPOSITION	47
	B. QUANTITY	47
	C. POINT OF SAMPLING	48
APPENDIX		
	DESCRIPTION OF METHODOLOGY	

I. GENERAL BACKGROUND

SECTION I. GENERAL BACKGROUND

A. INTRODUCTION TO THIS REPORT

This report provides waste composition estimates based on sampling information from March, 1988 through March, 1989. Composition data are provided for three primary waste substreams:

- o residential
- o commercial
- o self-haul

A description of the methodology appears in the Appendix.

B. OVERVIEW OF THE WASTE COMPOSITION STUDY

In response to the need for a more detailed examination of the City's waste stream composition, the Solid Waste Utility launched the Waste Stream Characterization Study in early 1988. The City's objectives included:

- o obtaining information for characterizing the total waste stream,
- o establishing a factual basis for its Recycling and Waste Reduction Programs and a baseline for continued long-term measurement of system performance,
- o obtaining specific data about various waste substreams to enable the City to estimate recyclability of each,
- o understanding the differences between substreams so that targeted recycling programs can be designed, implemented, and monitored, and
- o determining waste generation factors for various residential and commercial substreams, thereby enabling the City to forecast future composition.
- o Creating a database to be used by the City for ongoing evaluation and analysis of present waste composition data and for management of future sampling data.

A consultant team led by the Matrix Management Group began work in February. A research and sampling methodology was established in cooperation with the Utility's Staff. The work began by gathering pertinent information regarding routes, demographics, facilities and operating schedules which would impact the sampling program. The focus of these initial activities was to develop a sampling design and to organize sampling

activities. In all, 550 field samples were sorted over the 13-month Study. In late March, 1988 residential sampling began. Self-haul and commercial samplings began in April. Residential and commercial samplings concluded in February, 1989. Self-haul sampling concluded in March.

II. SUMMARY OF FINDINGS: TOTAL DISPOSED WASTE

SECTION II. SUMMARY OF FINDINGS: TOTAL DISPOSED WASTE

In all, a total of 550 samples were sorted from March, 1988 through March, 1989. Waste from three substreams was sampled:

SUBSTREAM	NUMBER OF SAMPLES
Residential	212
Self-haul	217
Commercial	97
Commercial Pure	24
Total	550

Residential and self-haul wastes were sampled at both the City's North and South Transfer Stations. Residential samples were taken from randomly selected routes. Self-haul waste was systematically selected from vehicles arriving at the transfer stations. Commercial waste composition estimates were based on one random sample of loads drawn from all commercial routes picked up within the City.

The point at which waste was sampled affects the final results. Recycling occurred in all instances upstream from the point of sampling. In the case of self-hauled waste and commercial waste, recycling occurred after sampling. Consequently, sampling data does not represent waste at the point of generation; nor does it reflect the composition of disposed waste. It accurately profiles the various substreams as delivered to the City's and to commercial haulers' transfer stations. Recycling data must be added to waste composition data in order to accurately characterize waste at the point of generation. In each section of this report covering residential, self-haul, and commercial composition, the point at which sampling occurred is graphically described.

An estimated total of 492,200 tons were disposed in 1988 (this does not include the 88,000 tons of demolition and construction debris from Seattle which was disposed at the Newcastle Landfill.

The 492,200 tons of disposed waste amount to approximately 5.5 pounds per day for each of Seattle's 490,000 residents. This is equivalent to over 5,350 tons per square mile each year. Residentially-generated waste only represents 2 pounds per day for each City resident. Commercial disposed waste amounts to approximately 2.5 pounds per day for each employee. Approximately 1 pound per day per resident of waste is also self-hauled by a combination of commercial and residential generators.

The quantities contributed by each of the major substreams, Residential, Self-haul and Commercial, are displayed in Figure T-1. Disposal rates are shown in Figure T-2.

Composition percentages for the overall Seattle disposed waste stream are provided in Table T-1. These estimates were calculated by adding the projected tonnages for each category of waste from the three substreams. Percentages for the total waste stream were then calculated for each category. The percentages for major material classes are shown in Figure T-3.

Detailed composition data for each substream is presented in Sections IV, V, and VI for the residential, self-haul, and commercial waste substreams respectively.

Load specific sample data is maintained in a database constructed specifically for the purpose of processing the waste composition data. The database contains a variety of information related to these samples, and data for the various sub-streams can be extracted and analyzed separately. The field sampling information in this database is used to create waste composition estimates, such as those provided in this report.

Figure T - 1

1988 TOTAL DISPOSED WASTES

SUBSTREAM CONTRIBUTIONS

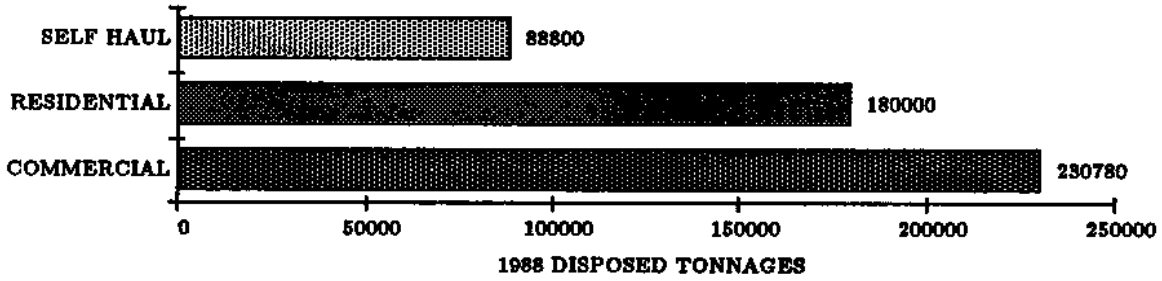


Figure T - 2

1988 TOTAL DISPOSED WASTES

SUBSTREAM DISPOSAL RATES

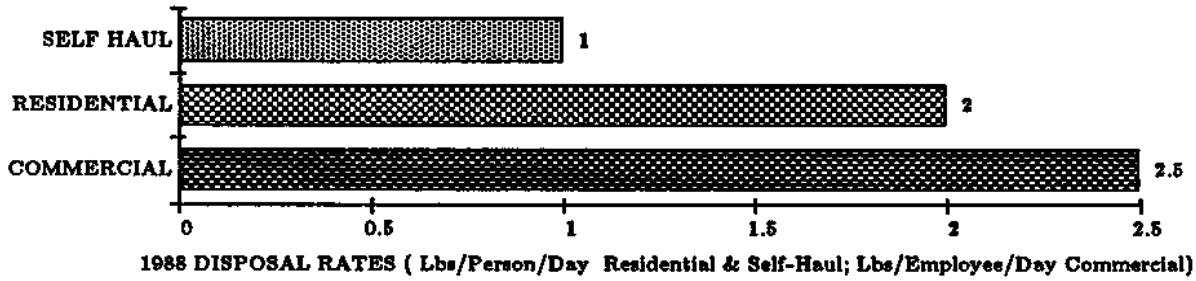
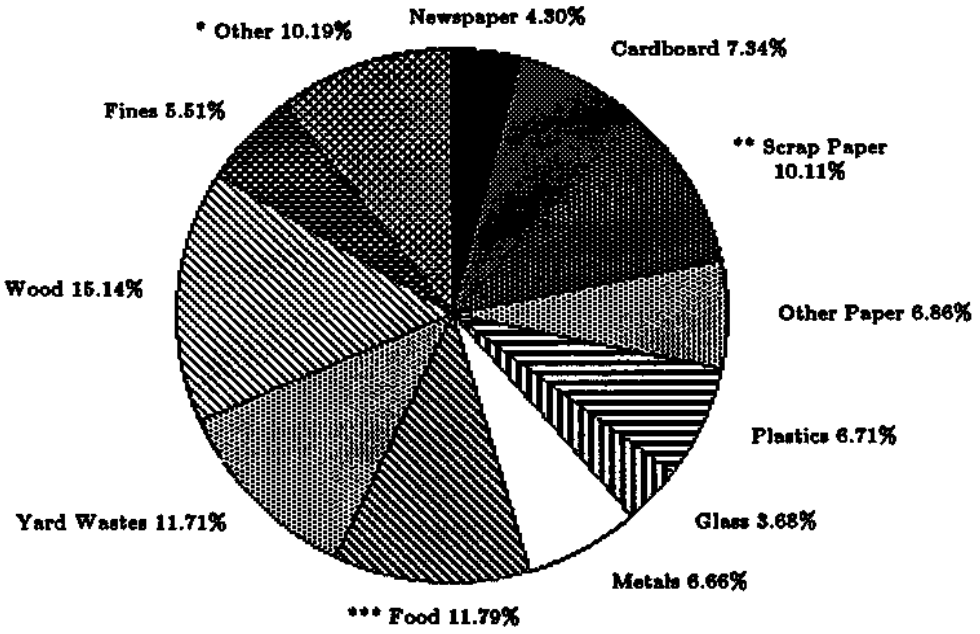


Figure T - 3

WASTE COMPONENT PERCENTAGES BY WEIGHT

TOTAL DISPOSED



* Textiles 2.70%, Construction Debris 1.66%, Drywall 1.65%, Disposable Diapers 1.17%, Rock/Concrete/Brick 1.15%, Hazardous 0.64%, Misc. 1.22%

** Includes computer and office paper

*** Includes some containers

SEATTLE WASTE COMPOSITION STUDY
COMPONENT PERCENTAGES BY WEIGHT

TABLE T-1

TOTAL 1988 DISPOSED WASTE STREAM

	TOTAL TONS DISPOSED	PERCENT OF DISPOSED
PAPER		
Newspaper	21,467	4.30
Corrugated Paper	36,654	7.34
Computer Paper	1,105	0.22
Office Paper	3,215	0.64
Mixed Scrap Paper	46,227	9.25
Other Paper	34,269	6.86
PLASTIC		
PET Bottles	746	0.15
HDPE Bottles	1,185	0.24
Expanded Polystyrene	2,217	0.44
Plastic Packaging	22,825	4.57
Other Plastic Products	6,542	1.31
GLASS		
Nonrefillable Beer	3,740	0.75
Refillable Beer	801	0.16
Nonrefillable Pop	2,429	0.49
Refillable Pop	165	0.03
Container Glass	9,877	1.98
Nonrecyclable Glass	1,373	0.27
METAL		
Aluminum Cans	2,614	0.52
Aluminum Containers	568	0.11
Tin Cans	4,654	0.93
Bi-metal Cans	240	0.05
Ferrous Metals	10,917	2.19
White Goods	2,063	0.41
Nonferrous Metals	856	0.17
Mixed Metals/Materials	11,390	2.28
RUBBER		
Rubber Products	2,043	0.41
Tires	371	0.07
ORGANICS		
Food	58,914	11.79
Prunings	25,010	5.01
Leaves and Grass	33,463	6.70
Wood	75,640	15.14
OTHER		
Disposable Diapers	5,821	1.17
Textiles	13,509	2.70
Leather	400	0.08
Ash	1,058	0.21
Ceramics, Porcelain, China	1,132	0.23
Rocks, Concrete, Bricks	5,764	1.15
Soil, Dirt, Nondistinct Fines	27,521	5.51
Gypsum Drywall	8,250	1.65
Fiberglass Insulation	980	0.20
Construction Debris	8,276	1.66
HAZARDOUS		
Latex Paints	477	0.10
Adhesives, Glues	470	0.09
Oil-based Paints	661	0.13
Cleaners	356	0.07
Pesticides	68	0.01
Batteries	466	0.09
Gasoline	18	0.00
Motor Oil, Diesel Oil	637	0.13
Asbestos	0	0.00
Explosives	19	0.00
Other Chemicals	121	0.02
* TOTAL TONNAGE:	499,585	

* Includes 7330 tons of self-haul recoverables

III. TERMINOLOGY AND DEFINITIONS

SECTION III. TERMINOLOGY AND DEFINITIONS

A. SUBSTREAMS

The total waste stream is composed of various substreams. A "substream" is defined by the particular generation and collection characteristics which make it a unique portion of the total. For this study there were three primary substreams: residential, commercial, and self-haul.

The residential substream is defined as the total waste from residential service areas covered by the two haulers providing contract collection services for the City. Residential wastes from both single and multifamily dwellings are included.

Commercial waste is defined as business, industry, government and institutional wastes collected by private haulers from non-residential customers.

The self-haul substream contains both residential and commercial wastes. It is defined as waste hauled to one of the City's two transfer stations by any vehicle, other than commercial vehicles engaged in providing waste collection services.

B. WASTE COMPONENT CATEGORIES

All sampled waste was sorted into one of fifty-two waste component categories. Medical wastes, animal carcasses, feces and such were excluded from sorting; virtually everything else was weighed and recorded. The list of component categories follows. Of the 52 specific categories, 11 are for household hazardous wastes. Although these hazardous wastes are grouped in this list, they are each listed individually in the composition tables.

NEWSPAPER: Printed newsprint, including advertising "slicks" (glossy paper), unless found separately.

CORRUGATED PAPER: Kraft paper and unwaxed corrugated containers and boxes, unless laminated with other paper such as glossy stock. Includes also brown kraft paper bags.

COMPUTER PAPER: Continuous-feed computer printouts and forms of all types, except multiple-copy carbonless paper.

OFFICE PAPER: High-grade, white or light colored bond and copy machine papers and envelopes.

MIXED SCRAP PAPER: Low-grade, potentially recyclable papers, including magazines, colored papers, non-corrugated paperboard, and paperback books.

OTHER PAPER: Contaminated papers including carbon/carbonless copy paper, tissues, paper towels, paper plates, waxed papers, frozen food containers, envelopes with plastic windows, paper packaging with metal or plastic parts, and hardcover books.

PET BOTTLES: Polyethylene terephthalate 2-liter pop bottles, with or without base, and PET liquor bottles.

HDPE BOTTLES: High-density polyethylene milk and juice containers.

EXPANDED POLYSTYRENE: Includes packaging and finished products made of expanded polystyrene.

PLASTIC PACKAGING: All plastic packaging films, and shipping materials and other plastic items which are not themselves finished consumer products, including thermoplastics and thermosetting plastics used as packaging.

OTHER PLASTIC PRODUCTS: Finished plastic products such as toys, toothbrushes, vinyl hose, and shower curtains. Includes fiberglass resin products and materials.

NONREFILLABLE BEER BOTTLES: All green, clear or quart-sized beer bottles; all brown glass beer bottles not categorized as refillable.

REFILLABLE BEER BOTTLES: Brown glass bottles from western breweries, excluding quart-sized, such as Rainier, Olympia, Lucky.

NONREFILLABLE POP BOTTLES: All non-deposit soda pop, juice, and water bottles of all colors.

REFILLABLE POP BOTTLES: Soda pop bottles of any color; glass marked as deposit or refillable by the manufacturer.

CONTAINER GLASS: All glass food containers, wine and wine cooler bottles, and other glass containers of any color.

NONRECYCLABLE GLASS: Window glass, light bulbs, glassware, etc.

ALUMINUM CANS: Aluminum beverage cans.

ALUMINUM CONTAINERS: Aluminum food containers and aluminum foil.

TINNED CANS: Tinned steel food containers.

BI-METAL CANS: Steel-aluminum food and beverage cans.

FERROUS METALS: Ferrous and alloyed ferrous scrap metals to which a magnet adheres which are not significantly contaminated with other metals or materials.

WHITE GOODS: Large household appliances or parts thereof.

NONFERROUS METALS: Metals not derived from iron, to which a magnet will not adhere, which are not significantly contaminated with other metals or materials.

MIXED METALS/MATERIALS: Small appliances, motors, insulated wire, and finished products containing a mixture of metals, or other materials, whose weight is significantly from the metal portion of its construction.

RUBBER PRODUCTS: Finished products and scrap materials made of rubber, such as bath mats, inner tubes, rubber hose, and foam rubber.

TIRES: Vehicle tires of all types.

FOOD: Food wastes and scraps, including bone, rinds, etc. Includes food containers when the container weight is not appreciable compared to the food inside.

YARD WASTE-PRUNINGS: Cut prunings, 6" or less in diameter, from bushes, shrubs, and trees.

YARD WASTE-LEAVES AND GRASS: Grass clippings, leaves, and weeds.

WOOD: Finished lumber, products made of wood, and prunings or stumps 6" or greater in diameter.

TEXTILES: Cloth, material fiber rope, rubberized cloth.

LEATHER: Finished products or scraps of leather.

ASH: Fireplace, burn barrel or firepit ash.

CERAMICS, PORCELAIN, CHINA: Finished products of such material including dishware, toilets, etc.

ROCK, CONCRETE, BRICKS: Includes rock gravel, Portland cement mixtures (set or unset), and fired-clay bricks.

SAND, SOIL, DIRT AND NON-DISTINCT FINES: Includes mixed fines smaller than 2" in size. Approximately 30-40% of the fines found in residential and self-haul samples were yard wastes.

GYPSUM DRYWALL: Used or new gypsum wallboard.

FIBERGLASS INSULATION: Fiberglass batt building and mechanical insulation.

CONSTRUCTION DEBRIS: Construction debris, other than wood, which could not be classified into other component categories, i.e., asphalt shingles, mixed fine material scraps.

DISPOSABLE DIAPERS: Disposable baby diapers and adult protective undergarments.

HOUSEHOLD HAZARDOUS WASTES: Paints, caustic cleaners, batteries, petroleum products and other chemicals, including spent containers.

C. DEMOGRAPHIC DATA

Socio-economic data including household income, household size, and education levels were obtained for each of the residential areas served by one of the routes which was sampled during the year. Table R-8 provides residential composition estimates for low, medium, and high income households. The household's income data for each of the single-family residential samples is included on the microcomputer database which was provided to the City.

D. COMPOSITION CALCULATIONS

The composition estimates represent component percentages by weight for each noted substream. They were derived by summing each component's weight across all of the selected samples, and then dividing the summed component by the summed total sample weights for all selected records, as shown in the following equation:

$$C = (w/t) \times 100$$

where: C = Component mean percentage by weight for the selected samples.

w = Total component weight in pounds for the selected samples.

t = Total weight in pounds for the selected samples.

Precision levels at the 90% confidence level were calculated for component's mean as follows:

Precision Level = $\pm$ z * s/square root of n
(in pounds)

where: z = Value of the t statistic (1.645) corresponding to a 90% confidence level.

s = Standard deviation of the mean component weight for all selected samples.

n = Number of selected samples.

The formula above results in a precision level expressed as a range of pounds around the mean component weight per sample. This was converted to a percentage as follows:

Precision Level = Precision Level pounds./x * 100 (in percent)

where: x = Mean value in pounds for the component.

The range for each component's estimate was then calculated:

Lower limit of range = C - Precision Level %

Upper limit of range = C + Precision Level %

IV. THE RESIDENTIAL WASTE STREAM

SECTION IV. THE RESIDENTIAL WASTE STREAM

A. COMPOSITION

Residential sampling occurred from March, 1988 through February, 1989. A total of 212 samples were sorted during this period. Composition estimates were calculated for single-family and multifamily generators, as well as for the North and South collection areas (as determined by the destination for hauled waste: North or South Transfer Station). Single-family generators included up to four-plex apartments.

The City's curbside recycling program had been initiated in both the service areas prior to sampling. Sampling coincided with the successful first-year curbside effort. Only single-family residences participated in the recycling program.

Table R-1 provides general information regarding the residential samples. Composition estimates are presented in Tables R-2 through R-7. Each of these tables is described below.

TABLE R-2: TOTAL RESIDENTIAL BY ORIGIN AND OVERALL

A total of 212 single and multifamily samples were sorted between March, 1988 and February, 1989. Table R-2 shows data for the North and South collection areas. These samples, taken from randomly selected routes, were allocated in proportion to the total residential waste hauled to the North and South Transfer Stations during the most recent twelve-month period. Accordingly, 99 samples from the North and 113 samples from the South were sorted. The composition estimates for these two areas are shown, as well as for the City's total residential waste stream. Precision levels are also provided for Citywide residential sampling.

TABLE R-3: TOTAL RESIDENTIAL BY RESIDENCE TYPE

Table R-3 presents composition data for Citywide single-family and multifamily collection. The proportion of multifamily samples to single-family samples was a result of the random selection process; it was not predetermined.

TABLE R-4: SINGLE-FAMILY RESIDENTIAL BY ORIGIN

The composition of North and South single-family residential waste, and for all single family residences is given in Table R-4. The split between the number of North and South residential samples was predetermined, based on amounts disposed. The total number of single-family versus multifamily samples was a function of the random selection of all residential waste hauling routes.

TABLE R-5: MULTIFAMILY RESIDENTIAL BY ORIGIN

The composition of North and South multifamily residential, and for all multifamily residential wastes, is given in Table R-5. The total number of multifamily samples was a result of random selection at both the North and South Transfer Stations.

TABLE R-6: SINGLE-FAMILY RESIDENTIAL BY SEASON

This table provides the overall mean percentages, by component, for the four seasons. Winter is defined as December, January, and February. Each following season corresponds to successive three-month intervals. All 212 residential samples are distributed within this table.

TABLE R-7: TOTAL RESIDENTIAL BY MONTH

This table presents data for each of the twelve months during which sampling occurred.

TABLE R-8: SINGLE-FAMILY RESIDENTIAL BY INCOME

Based on 1980 census information for median household income, this table shows composition estimates for three levels of single-family residential samples. Multi-family samples were excluded from this selection because multi-family routes cover numerous census tracts. For the purposes of this table, low income census tracts are defined as those having a median household income less than or equal to $13,003, which is 80% of the City-wide median of $16,254. High income tracts are identified as those tracts with median incomes greater than or equal to $19,505 or 120% of the median household income. Middle income tracts lie between $13,004 and $19,504.

Data from up to two census tracts per single-family route are recorded, due to the multiple tracts which may have been served by any given route. Primary and secondary tracts are assigned based on an approximation of route area lying within the census tract. Where routes covered two or more tracts, only those samples with both tracts lying within the same income range were selected. The result was that 40 of 181 single-family samples were not used.

B. QUANTITY

The total disposed residential waste from the City's two contract haulers was determined from actual Utility records. This disposed quantity amounted to 179,968 tons in 1988.

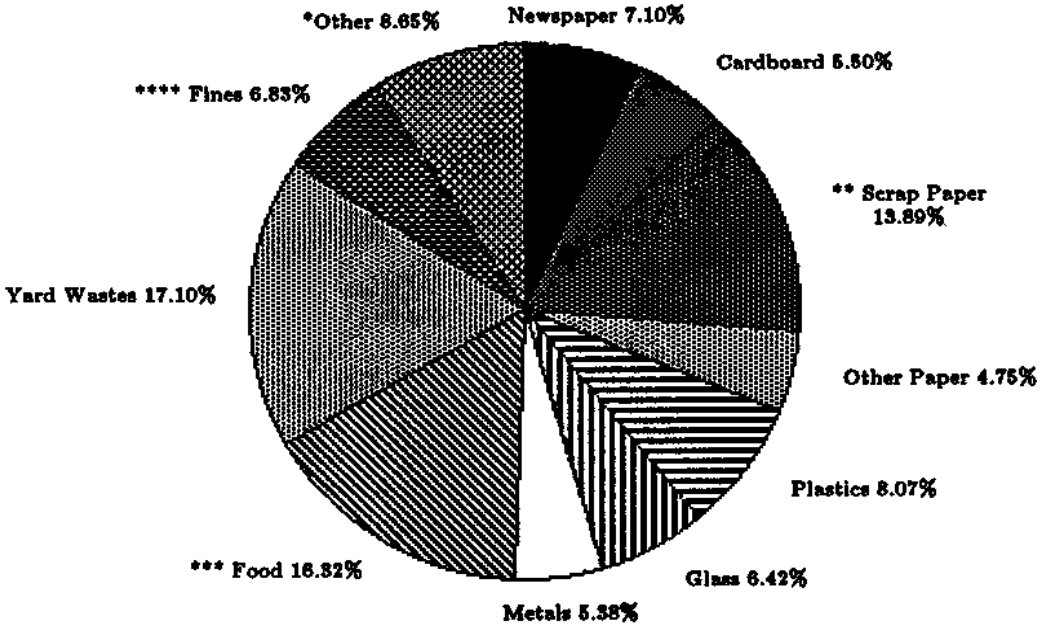
C. POINT OF SAMPLING

Residential sampling occurred at the City transfer stations after curbside and dropoff/buyback programs diverted some recyclable materials at individual households. (See Figure R-2)

Figure R - 1

WASTE COMPONENT PERCENTAGES BY WEIGHT

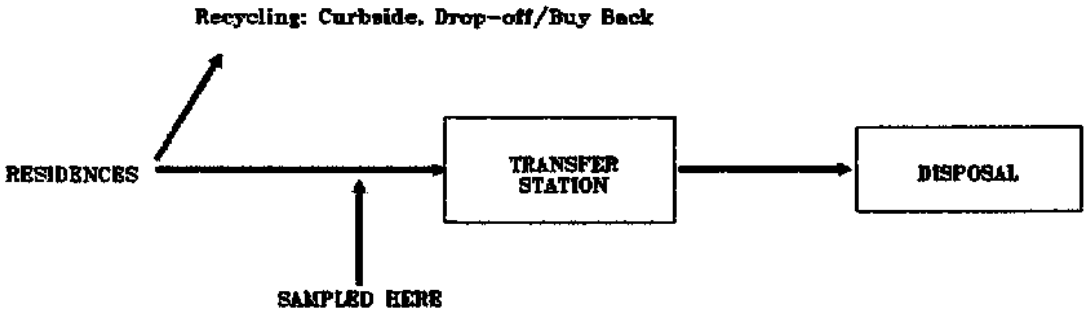
RESIDENTIAL DISPOSED



* Textiles 2.67%, Disposable Diapers 2.49%, Hazardous 0.67%, Misc. 2.82%
** Includes computer and office paper
*** Includes some containers
**** Approximately 30 - 40 % yard wastes

Figure R - 2

POINT OF RESIDENTIAL SAMPLING IN WASTE STREAM



SEATTLE WASTE COMPOSITION STUDY
SAMPLING INFORMATION
RESIDENTIAL SAMPLES

TABLE R-1

GENERAL INFORMATION

Sampling Period: March, 1988 through February, 1989

Total Number of Samples: 212*

North Origin: 99*
South Origin: 113*

Average Sample Weight(pounds): 277.1* Sum of Sample Weights(pounds): 58,754.8

Average Total Load Weight: 14,635.00 Sum of Total Load Weights: 3,102,700

INFORMATION BY GENERATOR TYPE

Number of Single-Family Samples: 181

North Origin: 87
South Origin: 94

Average Sample Weight(pounds): 280.4

Average Total Load Weight: 14,612

Sum of Sample Weights: 50,747.0

Sum of Total Load Weights: 2,645,060

Number of Multifamily Samples: 31

North Origin: 12
South Origin: 19

Average Sample Weight(pounds): 258.3

Average Total Load Weight: 14,763

Sum of Sample Weights: 8,007.8

Sum of Total Load Weights: 457,640

* Predetermined amounts or distributions

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE R-2

TOTAL RESIDENTIAL from March, 1988 through February, 1989
BY ORIGIN AND OVERALL

	All Residential North	All Residential South	ALL RESIDENTIAL Mean Percentages and Ranges at the 90% Confidence Level %	±	Low	High
PAPER						
Newspaper	7.13	7.08	7.10	0.68	6.42	7.78
Corrugated Paper	5.45	5.54	5.50	0.46	5.04	5.96
Computer Paper	0.02	0.00	0.01	0.02	-0.01	0.03
Office Paper	0.26	0.22	0.24	0.14	0.10	0.38
Mixed Scrap Paper	13.55	13.71	13.64	0.96	12.67	14.60
Other Paper	5.01	4.52	4.75	0.44	4.31	5.19
PLASTIC						
PET Bottles	0.26	0.35	0.31	0.04	0.27	0.35
HDPE Bottles	0.22	0.32	0.27	0.03	0.24	0.30
Expanded Polystyrene	0.46	0.47	0.47	0.05	0.42	0.51
Plastic Packaging	5.36	5.67	5.52	0.36	5.16	5.88
Other Plastic Products	1.51	1.50	1.50	0.17	1.33	1.68
GLASS						
Nonrefillable Beer	1.07	1.59	1.34	0.18	1.16	1.52
Refillable Beer	0.24	0.15	0.19	0.06	0.13	0.25
Nonrefillable Pop	0.57	0.91	0.75	0.10	0.65	0.85
Refillable Pop	0.02	0.00	0.01	0.02	-0.01	0.03
Container Glass	3.32	4.52	3.94	0.29	3.64	4.23
Nonrecyclable Glass	0.24	0.14	0.19	0.08	0.11	0.27
METAL						
Aluminum Cans	0.68	0.66	0.67	0.07	0.60	0.75
Aluminum Containers	0.16	0.22	0.19	0.05	0.15	0.24
Tin Cans	1.71	1.96	1.84	0.14	1.70	1.98
Bi-metal Cans	0.04	0.20	0.12	0.06	0.06	0.19
Ferrous Metals	0.61	0.29	0.44	0.16	0.29	0.60
White Goods	0.01	0.05	0.03	0.03	0.00	0.06
Nonferrous Metals	0.20	0.12	0.16	0.08	0.08	0.24
Mixed Metals/Materials	2.22	1.66	1.93	0.26	1.67	2.19
RUBBER						
Rubber Products	0.35	0.15	0.24	0.08	0.17	0.32
Tires	0.05	0.00	0.02	0.03	0.00	0.05
ORGANICS						
Food	14.09	18.40	16.32	1.16	15.16	17.49
Prunings	5.70	3.02	4.31	0.86	3.45	5.17
Leaves and Grass	14.70	11.01	12.79	1.87	10.92	14.66
Wood	1.08	1.35	1.22	0.42	0.80	1.64
OTHER						
Disposable Diapers	2.21	2.76	2.49	0.32	2.18	2.81
Textiles	2.75	2.60	2.67	0.46	2.21	3.13
Leather	0.11	0.20	0.16	0.05	0.10	0.21
Ash	0.37	0.37	0.37	0.15	0.22	0.53
Ceramics, Porcelain, China	0.09	0.03	0.06	0.03	0.03	0.08
Rocks, Concrete, Bricks	0.00	0.10	0.05	0.05	0.00	0.10
Soil, Dirt, Non-distinct Fines	6.39	7.23	6.83	1.01	5.82	7.83
Gypsum Drywall	0.31	0.30	0.30	0.16	0.14	0.46
Fiberglass Insulation	0.00	0.00	0.00	0.00	0.00	0.00
Construction Debris	0.73	0.09	0.40	0.18	0.22	0.58
HAZARDOUS						
Latex Paints	0.15	0.07	0.11	0.06	0.05	0.17
Adhesives, Glues	0.02	0.02	0.02	0.02	0.01	0.04
Oil-based Paints	0.10	0.09	0.10	0.04	0.06	0.14
Cleaners	0.16	0.14	0.15	0.04	0.11	0.19
Pesticides	0.03	0.03	0.03	0.02	0.01	0.05
Batteries	0.07	0.02	0.05	0.03	0.01	0.08
Gasoline	0.01	0.00	0.01	0.01	0.00	0.01
Motor Oil, Diesel Oil	0.18	0.16	0.17	0.05	0.12	0.22
Asbestos	0.00	0.00	0.00	0.00	0.00	0.00
Explosives	0.01	0.01	0.01	0.01	0.00	0.02
Other Chemicals	0.03	0.01	0.02	0.01	0.01	0.03
NUMBER OF SAMPLES REPRESENTED:	99	113	212			

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE R-3

TOTAL RESIDENTIAL from March, 1988 through February, 1989
BY RESIDENCE TYPE

	All Single-Family Residential	All Multifamily Residential	All Residential
PAPER			
Newspaper	6.42	11.42	7.10
Corrugated Paper	5.03	6.45	5.50
Computer Paper	0.01	0.00	0.01
Office Paper	0.25	0.18	0.24
Mixed Scrap Paper	12.55	20.49	13.64
Other Paper	4.75	4.80	4.75
PLASTIC			
PET Bottles	0.32	0.24	0.31
HDPE Bottles	0.28	0.20	0.27
Expanded Polystyrene	0.47	0.42	0.47
Plastic Packaging	5.58	5.12	5.52
Other Plastic Products	1.43	1.98	1.50
GLASS			
Nonrefillable Beer	1.26	1.81	1.34
Refillable Beer	0.19	0.21	0.19
Nonrefillable Pop	0.76	0.67	0.75
Refillable Pop	0.01	0.00	0.01
Container Glass	3.92	4.08	3.94
Nonrecyclable Glass	0.20	0.06	0.19
METAL			
Aluminum Cans	0.65	0.78	0.67
Aluminum Containers	0.21	0.10	0.19
Tin Cans	1.83	1.95	1.84
Bi-metal Cans	0.13	0.04	0.12
Ferrous Metals	0.40	0.73	0.44
White Goods	0.03	0.00	0.03
Nonferrous Metals	0.18	0.03	0.16
Mixed Metals/Materials	1.92	2.02	1.93
RUBBER			
Rubber Products	0.27	0.06	0.24
Tires	0.03	0.00	0.02
ORGANICS			
Food	16.35	16.18	16.32
Prunings	4.77	1.39	4.31
Leaves and Grass	14.46	2.21	12.79
Wood	0.99	2.69	1.22
OTHER			
Disposable Diapers	2.61	1.74	2.49
Textiles	2.59	3.21	2.67
Leather	0.15	0.23	0.16
Ash	0.41	0.11	0.37
Ceramics, Porcelain, China	0.06	0.03	0.06
Rocks, Concrete, Bricks	0.04	0.13	0.05
Soil, Dirt, Non-distinct Fines	7.05	5.41	6.83
Gypsum Drywall	0.33	0.10	0.30
Fiberglass Insulation	0.00	0.00	0.00
Construction Debris	0.41	0.28	0.40
HAZARDOUS			
Latex Paints	0.12	0.05	0.11
Adhesives, Glues	0.02	0.02	0.02
Oil-based Paints	0.10	0.07	0.10
Cleaners	0.16	0.08	0.15
Pesticides	0.03	0.00	0.03
Batteries	0.03	0.13	0.05
Gasoline	0.01	0.00	0.01
Motor Oil, Diesel Oil	0.18	0.12	0.17
Asbestos	0.00	0.00	0.00
Explosives	0.01	0.00	0.01
Other Chemicals	0.02	0.00	0.02
NUMBER OF SAMPLES REPRESENTED:	181	31	212

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE R-4

SINGLE-FAMILY RESIDENTIAL from March, 1988 through February, 1989
BY ORIGIN

	Residential Single-Family North	Residential Single-Family South	ALL SINGLE-FAMILY Mean Percentage and Range at the 90% Confidence Level %	±	Low	High
PAPER						
Newspaper	6.17	6.66	6.42	0.70	5.72	7.12
Corrugated Paper	5.09	4.97	5.03	0.41	4.63	5.44
Computer Paper	0.02	0.00	0.01	0.02	-0.01	0.03
Office Paper	0.25	0.25	0.25	0.16	0.09	0.41
Mixed Scrap Paper	12.38	12.73	12.55	0.83	11.72	13.38
Other Paper	4.89	4.61	4.75	0.48	4.26	5.23
PLASTIC						
PET Bottles	0.26	0.38	0.32	0.04	0.28	0.36
HDPE Bottles	0.22	0.33	0.28	0.03	0.24	0.31
Expanded Polystyrene	0.47	0.47	0.47	0.05	0.42	0.52
Plastic Packaging	5.50	5.65	5.58	0.39	5.19	5.97
Other Plastic Products	1.45	1.41	1.43	0.18	1.25	1.61
GLASS						
Nonrefillable Beer	1.04	1.48	1.26	0.18	1.08	1.45
Refillable Beer	0.24	0.15	0.19	0.06	0.13	0.25
Nonrefillable Pop	0.53	0.98	0.76	0.11	0.65	0.87
Refillable Pop	0.02	0.00	0.01	0.02	-0.01	0.03
Container Glass	3.39	4.42	3.92	0.31	3.61	4.22
Nonrecyclable Glass	0.26	0.15	0.20	0.09	0.11	0.30
METAL						
Aluminum Cans	0.69	0.62	0.65	0.08	0.57	0.74
Aluminum Containers	0.16	0.25	0.21	0.05	0.16	0.26
Tin Cans	1.77	1.88	1.83	0.15	1.68	1.97
Bi-metal Cans	0.04	0.23	0.13	0.07	0.06	0.21
Ferrous Metals	0.57	0.24	0.40	0.15	0.24	0.55
White Goods	0.01	0.05	0.03	0.04	0.00	0.07
Nonferrous Metals	0.22	0.14	0.18	0.09	0.09	0.27
Mixed Metals/Materials	2.25	1.60	1.92	0.28	1.63	2.20
RUBBER						
Rubber Products	0.38	0.17	0.27	0.09	0.18	0.36
Tires	0.06	0.00	0.03	0.03	-0.01	0.06
ORGANICS						
Food	13.85	18.74	16.35	1.23	15.11	17.58
Prunings	6.21	3.39	4.77	0.96	3.81	5.73
Leaves and Grass	16.59	12.41	14.46	2.07	12.38	16.53
Wood	0.78	1.19	0.99	0.43	0.56	1.42
OTHER						
Disposable Diapers	2.34	2.87	2.61	0.34	2.27	2.95
Textiles	2.70	2.47	2.59	0.51	2.08	3.10
Leather	0.10	0.19	0.15	0.06	0.09	0.20
Ash	0.42	0.40	0.41	0.18	0.24	0.59
Ceramics, Porcelain, China	0.09	0.03	0.06	0.03	0.03	0.09
Rocks, Concrete, Bricks	0.00	0.08	0.04	0.04	0.00	0.08
Soil, Dirt, Non-distinct Fines	6.68	7.40	7.05	1.13	5.92	8.18
Gypsum Drywall	0.35	0.32	0.33	0.18	0.15	0.52
Fiberglass Insulation	0.00	0.00	0.00	0.00	0.00	0.00
Construction Debris	0.76	0.08	0.41	0.20	0.21	0.62
HAZARDOUS						
Latex Paints	0.18	0.07	0.12	0.07	0.05	0.19
Adhesives, Glues	0.02	0.03	0.02	0.02	0.01	0.04
Oil-based Paints	0.11	0.10	0.10	0.05	0.06	0.15
Cleaners	0.18	0.14	0.16	0.04	0.12	0.20
Pesticides	0.03	0.04	0.03	0.02	0.02	0.05
Batteries	0.04	0.03	0.03	0.02	0.01	0.05
Gasoline	0.01	0.00	0.01	0.01	0.00	0.02
Motor Oil, Diesel Oil	0.18	0.18	0.18	0.05	0.13	0.23
Asbestos	0.00	0.00	0.00	0.00	0.00	0.00
Explosives	0.01	0.02	0.01	0.01	0.00	0.02
Other Chemicals	0.03	0.01	0.02	0.01	0.01	0.03
NUMBER OF SAMPLES REPRESENTED:	87	94	181			

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE R-5

MULTIFAMILY RESIDENTIAL from March, 1988 through February, 1989
BY ORIGIN

	Residential Multifamily North	Residential Multifamily South	ALL MULTIFAMILY Mean Percentages and Ranges at the 90% Confidence Level %	±	Low	High
PAPER						
Newspaper	13.99	9.46	11.42	1.96	9.46	13.38
Corrugated Paper	7.99	8.80	8.45	2.05	6.40	10.50
Computer Paper	0.00	0.00	0.00	0.00	0.00	0.00
Office Paper	0.34	0.06	0.18	0.24	-0.06	0.42
Mixed Scrap Paper	21.97	19.35	20.49	4.37	16.11	24.86
Other Paper	5.86	3.98	4.80	1.03	3.77	5.82
PLASTIC						
PET Bottles	0.28	0.21	0.24	0.06	0.18	0.30
HDPE Bottles	0.18	0.22	0.20	0.05	0.15	0.25
Expanded Polystyrene	0.35	0.48	0.42	0.11	0.32	0.53
Plastic Packaging	4.29	5.76	5.12	0.98	4.15	6.10
Other Plastic Products	1.91	2.03	1.98	0.56	1.42	2.53
PLASTIC						
Nonrefillable Beer	1.27	2.21	1.81	0.58	1.23	2.38
Refillable Beer	0.23	0.19	0.21	0.13	0.08	0.33
Nonrefillable Pop	0.83	0.54	0.67	0.18	0.49	0.84
Refillable Pop	0.00	0.00	0.00	0.00	0.00	0.00
Container Glass	2.75	5.09	4.08	0.98	3.10	5.05
Nonrecyclable Glass	0.06	0.07	0.06	0.06	0.01	0.12
METAL						
Aluminum Cans	0.64	0.89	0.78	0.17	0.61	0.95
Aluminum Containers	0.15	0.06	0.10	0.07	0.03	0.17
Tin Cans	1.31	2.43	1.95	0.42	1.52	2.37
Bi-metal Cans	0.03	0.06	0.04	0.05	-0.01	0.10
Ferrous Metals	0.94	0.58	0.73	0.63	0.11	1.36
White Goods	0.00	0.00	0.00	0.00	0.00	0.00
Nonferrous Metals	0.05	0.02	0.03	0.02	0.01	0.06
Mixed Metals/Materials	2.05	1.99	2.02	0.60	1.42	2.61
RUBBER						
Rubber Products	0.12	0.01	0.06	0.06	0.00	0.12
Tires	0.00	0.00	0.00	0.00	0.00	0.00
ORGANICS						
Food	15.82	16.45	16.18	3.45	12.72	19.63
Prunings	2.07	0.87	1.39	1.17	0.22	2.56
Leaves and Grass	1.16	3.01	2.21	1.33	0.87	3.54
Wood	3.23	2.28	2.69	1.42	1.28	4.11
OTHER						
Disposable Diapers	1.26	2.10	1.74	0.85	0.89	2.59
Textiles	3.09	3.30	3.21	0.94	2.27	4.15
Leather	0.23	0.22	0.23	0.14	0.08	0.37
Ash	0.03	0.16	0.11	0.15	-0.05	0.26
Ceramics, Porcelain, China	0.04	0.03	0.03	0.04	0.00	0.07
Rocks, Concrete, Bricks	0.00	0.23	0.13	0.21	-0.08	0.34
Soil, Dirt, Non-distinct Fines	4.33	6.23	5.41	1.69	3.71	7.10
Gypsum Drywall	0.00	0.18	0.10	0.17	-0.07	0.27
Fiberglass Insulation	0.00	0.00	0.00	0.00	0.00	0.00
Construction Debris	0.49	0.11	0.28	0.25	0.02	0.53
HAZARDOUS						
Latex Paints	0.00	0.09	0.05	0.05	0.00	0.10
Adhesives, Glues	0.05	0.00	0.02	0.04	-0.02	0.06
Oil-based Paints	0.06	0.07	0.07	0.05	0.02	0.11
Cleaners	0.04	0.11	0.08	0.04	0.04	0.13
Pesticides	0.00	0.01	0.00	0.01	0.00	0.01
Batteries	0.29	0.00	0.13	0.21	-0.08	0.33
Gasoline	0.00	0.00	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.21	0.05	0.12	0.14	-0.03	0.26
Asbestos	0.00	0.00	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals	0.00	0.01	0.00	0.01	0.00	0.01
NUMBER OF SAMPLES REPRESENTED:	12	19	31			

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE R-6

TOTAL RESIDENTIAL BY SEASON from March, 1988 through March, 1989

	WINTER	SPRING	SUMMER	FALL
	%	%	%	%
PAPER				
Newspaper	6.91	7.90	6.39	7.15
Corrugated Paper	5.68	5.81	5.49	5.05
Computer Paper	0.00	0.04	0.00	0.00
Office Paper	0.09	0.15	0.19	0.50
Mixed Scrap Paper	16.45	15.52	12.08	10.75
Other Paper	4.84	5.31	4.70	4.20
PLASTIC				
PET Bottles	0.43	0.20	0.28	0.31
HDPE Bottles	0.44	0.19	0.24	0.22
Expanded Polystyrene	0.62	0.34	0.35	0.55
Plastic Packaging	5.46	5.66	5.42	5.51
Other Plastic Products	2.07	0.87	1.60	1.51
GLASS				
Nonrefillable Beer	1.67	0.98	1.40	1.33
Refillable Beer	0.18	0.26	0.22	0.12
Nonrefillable Pop	0.46	0.76	1.17	0.62
Refillable Pop	0.00	0.04	0.00	0.00
Container Glass	4.81	3.50	4.01	3.51
Nonrecyclable Glass	0.02	0.28	0.08	0.33
METAL				
Aluminum Cans	0.76	0.48	0.78	0.68
Aluminum Containers	0.16	0.14	0.13	0.32
Tin Cans	2.41	1.88	1.52	1.60
Bi-metal Cans	0.03	0.05	0.03	0.35
Ferrous Metals	0.27	0.49	0.40	0.60
White Goods	0.00	0.07	0.04	0.00
Nonferrous Metals	0.19	0.05	0.23	0.17
Mixed Metals/Materials	2.25	1.46	2.02	2.01
RUBBER				
Rubber Products	0.23	0.31	0.37	0.08
Tires	0.00	0.00	0.00	0.09
ORGANICS				
Food	18.00	11.75	16.69	18.79
Prunings	4.13	2.47	4.21	6.28
Leaves and Grass	6.58	14.26	18.77	11.66
Wood	1.46	0.76	1.11	1.58
OTHER				
Disposable Diapers	3.98	1.82	1.93	2.30
Textiles	2.86	2.42	2.60	2.80
Leather	0.26	0.22	0.11	0.05
Ash	0.52	0.56	0.16	0.25
Ceramics, Porcelain, China	0.08	0.02	0.08	0.05
Rocks, Concrete, Bricks	0.00	0.07	0.02	0.11
Soil, Dirt, Non-distinct Fines	4.31	12.19	3.86	6.63
Gypsum Drywall	0.47	0.05	0.05	0.61
Fiberglass Insulation	0.00	0.00	0.00	0.00
Construction Debris	0.33	0.14	0.40	0.68
HAZARDOUS				
Latex Paints	0.05	0.18	0.08	0.12
Adhesives, Glues	0.04	0.00	0.02	0.03
Oil-based Paints	0.06	0.08	0.23	0.04
Cleaners	0.21	0.10	0.08	0.20
Pesticides	0.01	0.03	0.05	0.03
Batteries	0.01	0.02	0.11	0.04
Gasoline	0.00	0.00	0.03	0.00
Motor Oil, Diesel Oil	0.18	0.07	0.23	0.21
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.02	0.01	0.01
Other Chemicals	0.00	0.04	0.03	0.00
NUMBER OF SAMPLES REPRESENTED:	58	49	52	58

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TOTAL RESIDENTIAL BY MONTH

	March 88	April 88	May 88	June 88
PAPER				
Newspaper	12.27	5.01	6.86	5.13
Corrugated Paper	5.81	6.39	5.24	3.85
Computer Paper	0.00	0.00	0.11	0.00
Office Paper	0.20	0.14	0.12	0.17
Mixed Scrap Paper	22.06	18.78	11.49	11.72
Other Paper	6.59	5.20	4.31	2.38
PLASTIC				
PET Bottles	0.21	0.09	0.31	0.26
HDPE Bottles	0.23	0.14	0.20	0.20
Expanded Polystyrene	0.45	0.27	0.32	0.44
Plastic Packaging	7.24	5.89	4.06	4.82
Other Plastic Products	0.33	0.88	1.32	1.50
GLASS				
Nonrefillable Beer	1.37	0.98	0.62	1.35
Refillable Beer	0.07	0.20	0.47	0.23
Nonrefillable Pop	0.59	0.61	1.04	1.20
Refillable Pop	0.00	0.00	0.11	0.00
Container Glass	3.75	4.22	2.60	2.75
Nonrecyclable Glass	0.06	0.16	0.59	0.10
METAL				
Aluminum Cans	0.63	0.47	0.37	0.64
Aluminum Containers	0.14	0.15	0.12	0.20
Tin Cans	2.18	1.54	1.96	1.43
Bi-metal Cans	0.02	0.02	0.10	0.08
Ferrous Metals	0.57	0.75	0.17	0.20
White Goods	0.00	0.21	0.00	0.06
Nonferrous Metals	0.10	0.02	0.05	0.28
Mixed Metals/Materials	1.46	1.66	1.27	1.20
RUBBER				
Rubber Products	0.19	0.36	0.36	0.26
Tires	0.00	0.00	0.00	0.00
ORGANICS				
Food	9.67	11.90	13.43	17.17
Prunings	1.71	3.77	1.89	4.82
Leaves and Grass	3.86	15.57	22.10	27.74
Wood	0.47	0.40	1.36	1.62
OTHER				
Disposable Diapers	1.48	1.65	2.29	2.37
Textiles	2.47	2.82	2.00	2.67
Leather	0.39	0.22	0.05	0.06
Ash	0.38	0.58	0.69	0.38
Ceramics, Porcelain, China	0.03	0.03	0.00	0.12
Rocks, Concrete, Bricks	0.00	0.00	0.20	0.04
Soil, Dirt, Non-distinct Fines	12.60	12.75	11.29	1.54
Gypsum Drywall	0.13	0.02	0.02	0.05
Fiberglass Insulation	0.00	0.00	0.00	0.00
Construction Debris	0.01	0.28	0.13	0.11
HAZARDOUS				
Latex Paints	0.04	0.45	0.04	0.19
Adhesives, Glues	0.00	0.01	0.00	0.00
Oil-based Paints	0.17	0.02	0.05	0.09
Cleaners	0.03	0.11	0.14	0.05
Pesticides	0.01	0.04	0.03	0.10
Batteries	0.04	0.01	0.00	0.20
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.01	0.09	0.10	0.23
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.02	0.02	0.00
Other Chemicals	0.00	0.11	0.01	0.03
NUMBER OF SAMPLES REPRESENTED:	16	17	16	18

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TOTAL RESIDENTIAL BY MONTH

	July 88	August 88	September 88	October 88
PAPER				
Newspaper	8.79	5.68	7.80	7.53
Corrugated Paper	8.80	4.39	3.97	4.80
Computer Paper	0.00	0.00	0.00	0.00
Office Paper	0.30	0.11	0.67	0.13
Mixed Scrap Paper	11.45	13.02	9.43	11.74
Other Paper	5.73	6.32	2.51	3.60
PLASTIC				
PET Bottles	0.31	0.29	0.35	0.30
HDPE Bottles	0.27	0.25	0.16	0.31
Expanded Polystyrene	0.14	0.42	0.40	0.57
Plastic Packaging	5.26	6.21	4.16	6.48
Other Plastic Products	1.53	1.78	1.26	1.09
GLASS				
Nonrefillable Beer	1.92	1.00	0.98	1.80
Refillable Beer	0.04	0.36	0.04	0.16
Nonrefillable Pop	0.91	1.35	0.76	0.72
Refillable Pop	0.00	0.00	0.01	0.00
Container Glass	4.08	5.32	3.62	3.59
Nonrecyclable Glass	0.00	0.15	0.45	0.02
METAL				
Aluminum Cans	0.87	0.87	0.76	0.59
Aluminum Containers	0.05	0.14	0.08	0.33
Tin Cans	1.64	1.49	1.38	1.97
Bi-metal Cans	0.00	0.00	0.00	0.16
Ferrous Metals	0.64	0.41	1.46	0.16
White Goods	0.07	0.00	0.00	0.00
Nonferrous Metals	0.30	0.13	0.06	0.34
Mixed Metals/Materials	2.55	2.47	2.87	1.93
RUBBER				
Rubber Products	0.38	0.50	0.04	0.15
Tires	0.00	0.00	0.10	0.15
ORGANICS				
Food	14.99	17.66	21.22	21.33
Prunings	2.71	4.84	5.79	5.92
Leaves and Grass	19.26	8.56	6.64	10.94
Wood	0.32	1.25	4.28	0.18
OTHER				
Disposable Diapers	1.51	1.82	1.62	2.84
Textiles	2.42	2.69	2.67	3.09
Leather	0.11	0.16	0.12	0.02
Ash	0.08	0.00	0.02	0.42
Ceramics, Porcelain, China	0.00	0.09	0.16	0.00
Rocks, Concrete, Bricks	0.00	0.00	0.36	0.00
Soil, Dirt, Non-distinct Fines	1.43	8.52	9.93	5.11
Gypsum Drywall	0.10	0.00	0.96	0.82
Fiberglass Insulation	0.00	0.00	0.00	0.00
Construction Debris	0.32	0.79	1.77	0.24
HAZARDOUS				
Latex Paints	0.05	0.01	0.23	0.09
Adhesives, Glues	0.07	0.01	0.06	0.02
Oil-based Paints	0.05	0.53	0.03	0.05
Cleaners	0.06	0.13	0.45	0.09
Pesticides	0.03	0.01	0.01	0.08
Batteries	0.04	0.09	0.14	0.00
Gasoline	0.01	0.07	0.00	0.00
Motor Oil, Diesel Oil	0.36	0.11	0.20	0.10
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.03	0.00	0.00	0.04
Other Chemicals	0.02	0.03	0.00	0.00
NUMBER OF SAMPLES REPRESENTED:	18	16	18	18

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TOTAL RESIDENTIAL BY MONTH

	November 88	December 88	January 89	February 89
PAPER				
Newspaper	6.11	8.61	5.32	6.71
Corrugated Paper	6.38	5.63	5.18	6.31
Computer Paper	0.00	0.00	0.00	0.00
Office Paper	0.75	0.19	0.02	0.06
Mixed Scrap Paper	10.89	14.36	14.93	20.51
Other Paper	6.50	4.81	4.84	4.90
PLASTIC				
PET Bottles	0.80	0.33	0.50	0.49
HDPE Bottles	0.17	0.33	0.38	0.62
Expanded Polystyrene	0.68	0.42	0.77	0.67
Plastic Packaging	5.72	4.93	4.91	6.67
Other Plastic Products	2.23	1.24	2.60	2.48
GLASS				
Nonrefillable Beer	1.13	2.03	1.57	1.38
Refillable Beer	0.16	0.05	0.07	0.45
Nonrefillable Pop	0.36	0.41	0.57	0.41
Refillable Pop	0.00	0.00	0.00	0.00
Container Glass	3.33	4.44	4.92	5.10
Nonrecyclable Glass	0.57	0.04	0.00	0.03
METAL				
Aluminum Cans	0.70	0.65	0.81	0.82
Aluminum Containers	0.54	0.15	0.19	0.15
Tin Cans	1.38	2.36	2.48	2.38
Bi-metal Cans	0.91	0.01	0.03	0.06
Ferrous Metals	0.26	0.25	0.53	0.00
White Goods	0.00	0.00	0.01	0.00
Nonferrous Metals	0.08	0.50	0.02	0.03
Mixed Metals/Materials	1.27	1.58	2.51	2.73
RUBBER				
Rubber Products	0.03	0.45	0.19	0.03
Tires	0.00	0.00	0.00	0.00
ORGANICS				
Food	13.60	15.89	16.84	21.71
Prunings	7.15	4.33	5.88	1.97
Leaves and Grass	17.29	14.37	4.43	0.00
Wood	0.42	1.51	1.57	1.29
OTHER				
Disposable Diapers	2.33	2.60	5.48	3.93
Textiles	2.60	1.81	5.21	1.47
Leather	0.03	0.25	0.33	0.19
Ash	0.27	1.47	0.00	0.00
Ceramics, Porcelain, China	0.00	0.03	0.20	0.01
Rocks, Concrete, Bricks	0.00	0.00	0.00	0.00
Soil, Dirt, Non-distinct Fines	5.17	3.15	4.46	5.46
Gypsum Drywall	0.03	0.18	0.91	0.33
Fiberglass Insulation	0.00	0.00	0.00	0.00
Construction Debris	0.13	0.09	0.89	0.00
HAZARDOUS				
Latex Paints	0.05	0.10	0.03	0.03
Adhesives, Glues	0.02	0.01	0.10	0.00
Oil-based Paints	0.03	0.02	0.10	0.05
Cleaners	0.09	0.28	0.12	0.24
Pesticides	0.00	0.02	0.02	0.00
Batteries	0.00	0.01	0.00	0.03
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.36	0.10	0.10	0.36
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.01	0.00	0.00
Other Chemicals	0.01	0.01	0.00	0.00
NUMBER OF SAMPLES REPRESENTED:	17	18	21	19

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE R-8

SINGLE-FAMILY RESIDENTIAL from March, 1988 through February, 1989
BY CENSUS TRACT MEDIAN HOUSEHOLD INCOME

	Low Income	Middle Income	High Income
PAPER			
Newspaper	5.35	6.99	6.12
Corrugated Paper	6.80	4.94	5.03
Computer Paper	0.00	0.00	0.00
Office Paper	0.07	0.19	0.45
Mixed Scrap Paper	12.92	12.80	12.53
Other Paper	5.62	4.75	4.88
PLASTIC			
PET Bottles	0.56	0.30	0.29
HDPE Bottles	0.55	0.30	0.26
Expanded Polystyrene	0.51	0.53	0.47
Plastic Packaging	5.66	5.69	5.43
Other Plastic Products	1.79	1.52	1.22
GLASS			
Nonrefillable Beer	2.34	1.40	1.06
Refillable Beer	0.37	0.17	0.12
Nonrefillable Pop	2.11	0.74	0.65
Refillable Pop	0.00	0.00	0.00
Container Glass	6.74	4.12	3.78
Nonrecyclable Glass	0.24	0.10	0.35
METAL			
Aluminum Cans	0.57	0.66	0.65
Aluminum Containers	0.17	0.18	0.23
Tin Cans	2.30	1.84	1.74
Bi-metal Cans	0.19	0.15	0.13
Ferrous Metals	0.52	0.46	0.26
White Goods	0.00	0.07	0.00
Nonferrous Metals	0.00	0.22	0.21
Mixed Metals/Materials	2.11	2.13	1.62
RUBBER			
Rubber Products	0.45	0.25	0.25
Tires	0.00	0.02	0.06
ORGANICS			
Food	15.86	17.00	16.03
Prunings	0.67	4.64	5.58
Leaves and Grass	11.43	12.90	15.46
Wood	0.82	0.74	0.74
OTHER			
Disposable Diapers	2.44	2.65	3.03
Textiles	3.21	2.16	2.98
Leather	0.32	0.20	0.11
Ash	0.10	0.21	0.31
Ceramics, Porcelain, China	0.09	0.08	0.00
Rocks, Concrete, Bricks	0.00	0.01	0.00
Soil, Dirt, Non-distinct Fines	6.50	7.28	6.73
Gypsum Drywall	0.02	0.37	0.35
Fiberglass Insulation	0.00	0.00	0.00
Construction Debris	0.00	0.43	0.31
HAZARDOUS			
Latex Paints	0.06	0.20	0.04
Adhesives, Glues	0.00	0.01	0.01
Oil-based Paints	0.03	0.13	0.13
Cleaners	0.27	0.17	0.15
Pesticides	0.01	0.04	0.03
Batteries	0.04	0.05	0.01
Gasoline	0.00	0.01	0.00
Motor Oil, Diesel Oil	0.14	0.16	0.17
Asbestos	0.00	0.00	0.00
Explosives	0.00	0.02	0.01
Other Chemicals	0.04	0.02	0.01
NUMBER OF SAMPLES REPRESENTED:	10	73	58

V. THE SELF-HAUL WASTE STREAM

SECTION V. THE SELF-HAUL WASTE STREAM

A. COMPOSITION

Self-haul sampling began in April, 1988 and concluded in March, 1989. The sampling included 96 sorts at the South Transfer Station. One hundred twenty-one samples were sorted at the North Transfer Station.

A 50/50 split between transfer stations was intended. However, greater productivity at the North Transfer Station lead to 56% of the samples being taken there. The distribution between autos and trucks, approximately 40% and 60% respectively, was predetermined. This distribution was based on recorded tonnages contributed by each of these two vehicle types.

The composition estimate for self-haul was calculated by combining three separate substreams: 1) self-haul commercial trucks; 2) self-haul residential trucks, and 3) self-haul residential autos. The distribution of self-haul samples between residential and commercial generators was a function of random selection. Each driver of a systematically selected vehicle was asked whether they were disposing waste from a residence or from a commercial establishment.

Composition estimates were first calculated for each vehicle type by generator: residential or commercial. These estimates were then weighted by the estimated tonnages contributed by each vehicle type. The results were then combined to create an overall composition estimate, weighted to reflect relative commercial and residential contributions to total self-haul tonnage.

Table S-1 provides a profile of these 217 samples. Composition tables are explained below.

TABLE S-2: WEIGHTED SELF-HAUL BY VEHICLE TYPE

The composition estimates which follow in Tables S-3 through S-5 are combined in this table by vehicle type. Because there was an insignificant number of automobiles hauling commercial waste, self-haul automobile composition figures came from the sampling of residential automobiles only. These automobile percentages are thus the same as figures shown for self-haul residential autos (see Table S-5).

Truck composition is a weighted combination of residential and commercial component tonnages. Separate residential truck and commercial truck quantities were first applied to their respective composition estimates (See Tables S-3 and S-4). The resultant quantity distributions were then combined to calculate the All Self Haul estimate shown here.

Combined automobile and truck tonnages were used to calculate the overall self-haul substream percentages.

TABLES S-3, S-4 and S-5: SELF-HAUL COMMERCIAL TRUCKS; RESIDENTIAL TRUCKS; AND RESIDENTIAL AUTOS

Three unweighted self-haul composition estimates are presented in these tables: commercial trucks, residential trucks, and residential automobiles. Precision levels for these estimates are also provided.

Truck tonnages were divided into residential and commercial substreams, with corresponding composition estimates. Analysis of questionnaire results indicates that 56% of the total weight delivered by self-haul trucks was actually from residences.

There were only two commercial automobile records among the 76 automobile samples. This data was insufficient to estimate composition. Commercial automobile self-haul appears to be less than 5% of all auto self-haul tonnage. Therefore, all automobile tonnage is treated as residential, and only one composition estimate is provided.

TABLE S-6: WEIGHTED SELF-HAUL BY GENERATOR TYPE

These substream compositions were calculated by applying the composition estimates from Tables S-3 through S-5 to estimated vehicle tonnages for 1988. First, residential component weights for the separate truck and automobile substreams were summed together. Then, composition percentage estimates were calculated for the residential self-haul substream. Because there was an insignificant number of automobiles hauling commercial waste, there was no need to weight these figures by vehicle type. Thus, commercial composition figures shown are derived directly from the sampling of commercial trucks only.

The resulting residential and commercial component tonnages were added to determine total self-haul quantities by component. Component percentages were then calculated.

TABLES S-7, S-8 and S-9: SELF-HAUL COMMERCIAL TRUCKS BY SEASON; RESIDENTIAL TRUCKS BY SEASON; AND RESIDENTIAL AUTOS BY SEASON

These three tables give the seasonal distribution and composition percentages of the 47, 94, and 76 samples taken respectively from commercial trucks, residential trucks, and residential autos.

B. QUANTITY

According to Utility records, the 1988 self-haul tonnages from both transfer stations are grouped as follows:

Self-haul autos	11,969 Tons
Self-haul trucks	75,287
Clean Green (trucks & autos)	3,482
Recycling (trucks & autos)	3,846

The truck waste amount of 75,257 tons includes 5,781 tons brought by commercial haulers. Waste from haulers was excluded from self-haul sampling. For the purpose of composition estimating, these 5,781 tons were moved to the commercial sector quantities. Therefore, prior to weighting truck quantities for application to self-haul sample data, this amount was subtracted from the recorded total, leaving 69,506 truck tons. The adjusted self-haul quantities are as follows:

Self-haul autos	11,969 Tons
Adjusted Self-haul trucks	69,506
Clean Green (trucks & autos)	3,482
Recycling (trucks & autos)	3,846
Adjusted 1988 self-haul	88,803

In order to weight the sampling data, it was necessary to redistribute these quantities by generator type (residential/commercial) and vehicle type (auto/truck).

Clean green and recycled tonnages were first separated into auto and truck proportions by the ratio of auto waste to total self-haul waste: 11,969/(11,969 + 69,506) = .147. This produced the following distributions:

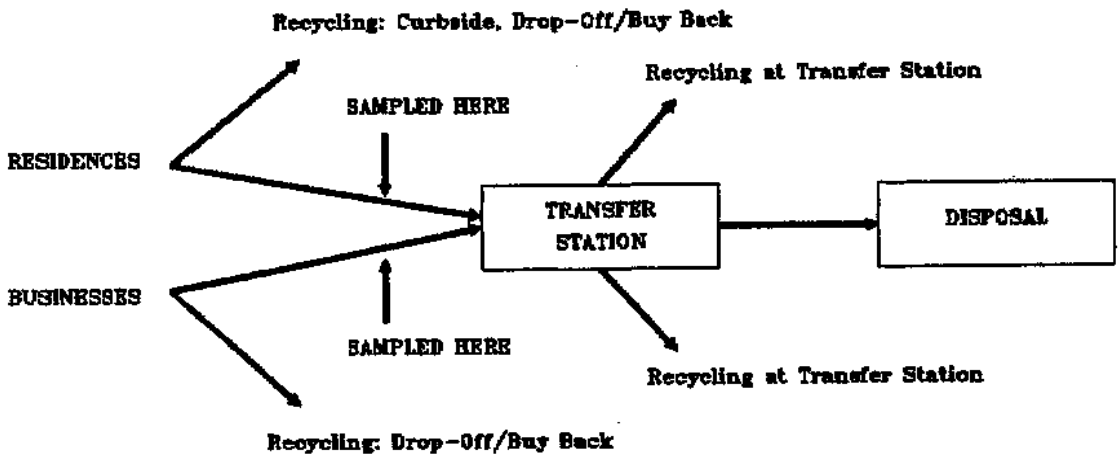
Auto clean green	512
Truck clean green	2,970
	3,482
Auto recycled	565
Truck recycled	3,281
	3,846

The total automobile and truck tonnage distributions became:

Recorded auto waste	11,969
Auto clean green	512
Auto recyclable	565
Total self-haul auto	13,046

Figure S - 2

POINT OF SELF-HAUL SAMPLING IN WASTE STREAM



SEATTLE WASTE COMPOSITION STUDY
SAMPLING INFORMATION
SELF-HAUL SAMPLES

TABLE S-1

GENERAL INFORMATION

Sampling Period: April, 1988 through March, 1989

Total Number of Samples: 217

North Transfer Station 121*
South Transfer Station 96*

Average Sample Weight: 288.4 pounds

INFORMATION BY GENERATOR TYPE

Number of Samples Residential = 168

North = 97
South = 71

Average Total Residential Load Weight (pounds) = 423

Number of Samples Commercial = 49

North = 29
South = 25

Average Total Commercial Load Weight (pounds) = 859

INFORMATION BY VEHICLE TYPE

Number of Trucks Sampled = 141*

Commercial = 47
Residential = 94

Average Total Load Weight All Trucks (pounds) = 662

Average Total Load Weight Commercial Trucks = 875

Average Total Load Weight Residential Trucks = 556

Sum of Total Loads for All Trucks (pounds) = 93,390

Sum of Total Loads for Commercial Trucks = 41,120

Sum of Total Loads for Residential Trucks = 52,270

Number of Autos Sampled = 76*

Commercial = 2
Residential = 74

Average Total Load Weight All Autos (pounds) = 260

Average Total Load Weight Commercial Autos = 490

Average Total Load Weight Residential Autos = 254

Sum of Total Loads for All Autos (pounds) = 19,745

Sum of Total Loads for Commercial Autos = 980

Sum of Total Loads for Residential Autos = 18,765

* Predetermined amounts or distributions

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-2

WEIGHTED SELF-HAUL BY VEHICLE TYPE from April, 1988 through March, 1989

	All Self-haul Auto	All Self-haul Truck	All Self-haul
PAPER			
Newspaper	1.38	0.63	0.74
Corrugated Paper	3.55	3.27	3.32
Computer Paper	0.00	0.05	0.04
Office Paper	0.08	0.11	0.10
Mixed Scrap Paper	3.44	1.71	1.96
Other Paper	1.13	1.67	1.59
PLASTIC			
PET Bottles	0.03	0.02	0.02
HDPE Bottles	0.04	0.01	0.02
Expanded Polystyrene	0.15	0.18	0.18
Plastic Packaging	0.93	1.55	1.46
Other Plastic Products	1.60	1.92	1.87
GLASS			
Nonrefillable Beer	0.25	0.19	0.20
Refillable Beer	0.58	0.02	0.10
Nonrefillable Pop	0.05	0.18	0.16
Refillable Pop	0.27	0.00	0.04
Container Glass	0.32	0.27	0.28
Nonrecyclable Glass	1.05	0.92	0.94
METAL			
Aluminum Cans	0.08	0.14	0.13
Aluminum Containers	0.01	0.01	0.01
Tin Cans	0.22	0.11	0.12
Bi-metal Cans	0.01	0.00	0.00
Ferrous Metals	5.30	4.30	4.44
White Goods	0.03	2.54	2.17
Nonferrous Metals	0.31	0.33	0.33
Mixed Metals/Materials	4.33	3.12	3.30
RUBBER			
Rubber Products	0.61	1.21	1.12
Tires	0.10	0.42	0.38
ORGANICS			
Food	2.16	1.83	1.88
Prunings	13.42	17.55	16.94
Leaves and Grass	14.30	8.12	9.03
Wood	15.16	25.37	23.37
OTHER			
Disposable Diapers	0.10	0.02	0.03
Textiles	5.43	4.87	4.95
Leather	0.16	0.05	0.07
Ash	0.35	0.02	0.07
Ceramics, Porcelain, China	0.57	0.69	0.67
Rocks, Concrete, Bricks	7.65	2.38	3.16
Soil, Dirt, Non-distinct Fines	7.84	3.94	4.51
Gypsum Drywall	4.12	3.45	3.55
Fiberglass Insulation	0.24	0.35	0.33
Construction Debris	0.87	5.29	4.64
HAZARDOUS			
Latex Paints	0.29	0.17	0.19
Adhesives, Glues	0.08	0.02	0.03
Oil-based Paints	0.08	0.49	0.43
Cleaners	0.01	0.02	0.01
Pesticides	0.01	0.00	0.00
Batteries	0.97	0.27	0.37
Gasoline	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.12	0.23	0.22
Asbestos	0.00	0.00	0.00
Explosives	0.01	0.00	0.00
Other Chemicals	0.26	0.05	0.08

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-3

SELF-HAUL COMMERCIAL TRUCKS
from April, 1988 through March, 1989

	Mean Percentages and Ranges at the 90% Confidence Level			
	%	±	Low	High
PAPER				
Newspaper	0.17	0.10	0.07	0.27
Corrugated Paper	3.93	2.05	1.87	5.98
Computer Paper	0.04	0.04	0.00	0.08
Office Paper	0.03	0.03	-0.01	0.06
Mixed Scrap Paper	1.08	0.74	0.34	1.82
Other Paper	2.63	3.35	-0.71	5.98
PLASTIC				
PET Bottles	0.00	0.00	0.00	0.01
HDPE Bottles	0.00	0.00	0.00	0.00
Expanded Polystyrene	0.17	0.17	-0.01	0.34
Plastic Packaging	2.62	2.53	0.10	5.15
Other Plastic Products	1.85	2.23	-0.38	4.09
GLASS				
Nonrefillable Beer	0.03	0.05	-0.02	0.08
Refillable Beer	0.00	0.00	0.00	0.00
Nonrefillable Pop	0.26	0.19	0.06	0.45
Refillable Pop	0.00	0.00	0.00	0.00
Container Glass	0.05	0.05	0.00	0.11
Nonrecyclable Glass	1.36	2.14	-0.79	3.50
METAL				
Aluminum Cans	0.16	0.11	0.05	0.26
Aluminum Containers	0.01	0.01	0.00	0.03
Tin Cans	0.01	0.01	0.00	0.02
Bi-metal Cans	0.00	0.00	0.00	0.00
Ferrous Metals	3.55	2.46	1.09	6.02
White Goods	5.65	6.41	-0.76	12.05
Nonferrous Metals	0.04	0.06	-0.02	0.10
Mixed Metals/Materials	1.83	1.38	0.45	3.21
RUBBER				
Rubber Products	1.92	2.51	-0.59	4.43
Tires	0.10	0.16	-0.06	0.26
ORGANICS				
Food	1.21	1.25	-0.04	2.46
Prunings	19.16	9.04	10.13	28.20
Leaves and Grass	8.38	5.96	2.42	14.33
Wood	28.84	11.15	17.69	39.99
OTHER				
Disposable Diapers	0.00	0.00	0.00	0.00
Textiles	2.84	3.39	-0.54	6.23
Leather	0.00	0.00	0.00	0.00
Ash	0.00	0.00	0.00	0.00
Ceramics, Porcelain, China	0.01	0.01	-0.01	0.02
Rocks, Concrete, Bricks	1.50	1.66	-0.17	3.16
Soil, Dirt, Non-distinct Fines	2.21	1.40	0.81	3.62
Gypsum Drywall	4.36	3.65	0.72	8.01
Fiberglass Insulation	0.13	0.21	-0.08	0.34
Construction Debris	3.56	2.11	1.45	5.67
HAZARDOUS				
Latex Paints	0.03	0.04	-0.02	0.07
Adhesives, Glues	0.02	0.02	0.00	0.04
Oil-based Paints	0.19	0.31	-0.11	0.50
Cleaners	0.01	0.01	0.00	0.02
Pesticides	0.00	0.00	0.00	0.00
Batteries	0.00	0.00	0.00	0.00
Gasoline	0.00	0.01	0.00	0.01
Motor Oil, Diesel Oil	0.06	0.07	-0.01	0.13
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00
Other Chemicals	0.00	0.00	0.00	0.00

NUMBER OF SAMPLES REPRESENTED: 47

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-4

SELF-HAUL RESIDENTIAL TRUCKS
from April, 1988 through March, 1988

	Mean Percentages and Ranges at the 90% Confidence Level			
	%	±	Low	High
PAPER				
Newspaper	0.99	0.61	0.38	1.59
Corrugated Paper	2.76	0.96	1.80	3.72
Computer Paper	0.06	0.08	-0.02	0.14
Office Paper	0.17	0.15	0.02	0.32
Mixed Scrap Paper	2.20	0.92	1.28	3.11
Other Paper	0.91	0.35	0.56	1.26
PLASTIC				
PET Bottles	0.03	0.03	-0.01	0.06
HDPE Bottles	0.02	0.01	0.01	0.03
Expanded Polystyrene	0.09	0.06	0.03	0.15
Plastic Packaging	0.71	0.20	0.50	0.91
Other Plastic Products	1.97	0.68	1.28	2.65
GLASS				
Nonrefillable Beer	0.31	0.33	-0.02	0.64
Refillable Beer	0.04	0.03	0.01	0.06
Nonrefillable Pop	0.11	0.06	0.05	0.17
Refillable Pop	0.00	0.00	0.00	0.00
Container Glass	0.45	0.17	0.28	0.62
Nonrecyclable Glass	0.58	0.33	0.25	0.91
METAL				
Aluminum Cans	0.13	0.10	0.04	0.23
Aluminum Containers	0.01	0.01	0.00	0.02
Tin Cans	0.18	0.08	0.10	0.26
Bi-metal Cans	0.00	0.00	0.00	0.00
Ferrous Metals	4.88	1.75	3.12	6.63
White Goods	0.10	0.16	-0.06	0.26
Nonferrous Metals	0.56	0.32	0.24	0.88
Mixed Metals/Materials	4.14	1.36	2.78	5.51
RUBBER				
Rubber Products	0.65	0.45	0.21	1.10
Tires	0.68	0.58	0.10	1.26
ORGANICS				
Food	2.32	2.49	-0.16	4.81
Prunings	16.28	5.43	10.85	21.70
Leaves and Grass	7.92	3.87	4.05	11.78
Wood	22.64	5.08	17.57	27.72
OTHER				
Disposable Diapers	0.04	0.05	-0.02	0.09
Textiles	6.46	2.27	4.19	8.74
Leather	0.09	0.06	0.03	0.15
Ash	0.04	0.07	-0.03	0.11
Ceramics, Porcelain, China	1.22	1.02	0.20	2.24
Rocks, Concrete, Bricks	3.08	2.28	0.80	5.37
Soil, Dirt, Non-distinct Fines	5.29	2.48	2.81	7.77
Gypsum Drywall	2.74	1.72	1.01	4.46
Fiberglass Insulation	0.52	0.77	-0.25	1.29
Construction Debris	6.64	4.83	1.81	11.47
HAZARDOUS				
Latex Paints	0.28	0.36	-0.07	0.64
Adhesives, Glues	0.02	0.02	0.00	0.05
Oil-based Paints	0.72	0.64	0.08	1.36
Cleaners	0.02	0.01	0.01	0.03
Pesticides	0.00	0.00	0.00	0.00
Batteries	0.48	0.35	0.13	0.83
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.37	0.46	-0.09	0.83
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00
Other Chemicals	0.09	0.07	0.02	0.16
NUMBER OF SAMPLES:	94			

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-5

SELF-HAUL RESIDENTIAL AUTOS
from April, 1988 through March, 1988

	Mean Percentages and Ranges at the 90% Confidence Level			
	%	±	Low	High
PAPER				
Newspaper	1.38	1.51	-0.13	2.89
Corrugated Paper	3.55	1.08	2.47	4.62
Computer Paper	0.00	0.00	0.00	0.00
Office Paper	0.08	0.11	-0.03	0.19
Mixed Scrap Paper	3.44	1.35	2.09	4.79
Other Paper	1.13	0.51	0.63	1.64
PLASTIC				
PET Bottles	0.03	0.03	0.00	0.07
HDPE Bottles	0.04	0.04	0.01	0.08
Expanded Polystyrene	0.15	0.09	0.06	0.24
Plastic Packaging	0.93	0.28	0.65	1.21
Other Plastic Products	1.60	0.67	0.93	2.28
GLASS				
Nonrefillable Beer	0.25	0.30	-0.05	0.55
Refillable Beer	0.58	0.85	-0.28	1.43
Nonrefillable Pop	0.05	0.03	0.01	0.08
Refillable Pop	0.27	0.37	-0.10	0.64
Container Glass	0.32	0.16	0.16	0.48
Nonrecyclable Glass	1.05	1.11	-0.06	2.16
METAL				
Aluminum Cans	0.08	0.05	0.03	0.13
Aluminum Containers	0.01	0.01	0.00	0.01
Tin Cans	0.22	0.16	0.05	0.38
Bi-metal Cans	0.01	0.01	-0.01	0.02
Ferrous Metals	5.30	2.41	2.89	7.71
White Goods	0.03	0.06	-0.02	0.09
Nonferrous Metals	0.31	0.19	0.12	0.49
Mixed Metals/Materials	4.33	2.57	1.76	6.90
RUBBER				
Rubber Products	0.61	0.33	0.28	0.93
Tires	0.10	0.15	-0.05	0.25
ORGANICS				
Food	2.16	1.51	0.65	3.66
Prunings	13.42	5.95	7.47	19.37
Leaves and Grass	14.30	6.13	8.17	20.44
Wood	15.16	6.88	8.28	22.04
OTHER				
Disposable Diapers	0.10	0.11	-0.01	0.21
Textiles	5.43	2.38	3.05	7.80
Leather	0.16	0.21	-0.05	0.37
Ash	0.35	0.36	0.00	0.71
Ceramics, Porcelain, China	0.57	0.55	0.01	1.12
Rocks, Concrete, Bricks	7.65	5.51	2.14	13.15
Soil, Dirt, Non-distinct Fines	7.84	4.36	3.48	12.20
Gypsum Drywall	4.12	3.81	0.31	7.93
Fiberglass Insulation	0.24	0.39	-0.15	0.63
Construction Debris	0.87	1.28	-0.41	2.15
HAZARDOUS				
Latex Paints	0.29	0.36	-0.06	0.65
Adhesives, Glues	0.08	0.12	-0.04	0.19
Oil-based Paints	0.08	0.06	0.02	0.13
Cleaners	0.01	0.01	0.00	0.02
Pesticides	0.01	0.01	0.00	0.02
Batteries	0.97	0.89	0.08	1.86
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.12	0.17	-0.05	0.28
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.01	0.01	0.00	0.01
Other Chemicals	0.26	0.23	0.02	0.49

NUMBER OF SAMPLES: 76

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-6

WEIGHTED SELF-HAUL BY GENERATOR TYPE from April, 1988 through March, 1989

	All Self-haul Residential	All Self-haul Commercial	All Self-haul
PAPER			
Newspaper	1.08	0.17	0.74
Corrugated Paper	2.95	3.93	3.32
Computer Paper	0.05	0.04	0.04
Office Paper	0.15	0.03	0.10
Mixed Scrap Paper	2.49	1.08	1.96
Other Paper	0.96	2.63	1.59
PLASTIC			
PET Bottles	0.03	0.00	0.02
HDPE Bottles	0.02	0.00	0.02
Expanded Polystyrene	0.10	0.17	0.13
Plastic Packaging	0.76	2.62	1.46
Other Plastic Products	1.88	1.85	1.87
GLASS			
Nonrefillable Beer	0.30	0.03	0.20
Refillable Beer	0.17	0.00	0.10
Nonrefillable Pop	0.10	0.26	0.16
Refillable Pop	0.06	0.00	0.04
Container Glass	0.42	0.05	0.28
Nonrecyclable Glass	0.69	1.36	0.94
METAL			
Aluminum Cans	0.12	0.16	0.13
Aluminum Containers	0.01	0.01	0.01
Tin Cans	0.19	0.01	0.12
Bi-metal Cans	0.00	0.00	0.00
Ferrous Metals	4.98	3.55	4.44
White Goods	0.08	5.65	2.17
Nonferrous Metals	0.50	0.04	0.33
Mixed Metals/Materials	4.18	1.83	3.30
RUBBER			
Rubber Products	0.64	1.92	1.12
Tires	0.54	0.10	0.38
ORGANICS			
Food	2.28	1.21	1.88
Prunings	15.61	19.16	16.94
Leaves and Grass	9.42	8.38	9.03
Wood	20.88	28.84	23.87
OTHER			
Disposable Diapers	0.05	0.00	0.03
Textiles	6.22	2.84	4.95
Leather	0.11	0.00	0.07
Ash	0.11	0.00	0.07
Ceramics, Porcelain, China	1.07	0.01	0.67
Rocks, Concrete, Bricks	4.15	1.50	3.16
Soil, Dirt, Non-distinct Fines	5.89	2.21	4.51
Gypsum Drywall	3.06	4.36	3.55
Fiberglass Insulation	0.45	0.13	0.33
Construction Debris	5.28	3.56	4.64
HAZARDOUS			
Latex Paints	0.28	0.03	0.19
Adhesives, Glues	0.03	0.02	0.03
Oil-based Paints	0.57	0.19	0.43
Cleaners	0.02	0.01	0.01
Pesticides	0.00	0.00	0.00
Batteries	0.60	0.00	0.37
Gasoline	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.31	0.06	0.22
Asbestos	0.00	0.00	0.00
Explosives	0.00	0.00	0.00
Other Chemicals	0.13	0.00	0.08

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-7

SELF-HAUL COMMERCIAL TRUCKS BY SEASON

	WINTER	SPRING	SUMMER	FALL
	%	%	%	%
PAPER				
Newspaper	0.18	0.30	0.00	0.23
Corrugated Paper	2.53	4.42	7.23	2.84
Computer Paper	0.00	0.08	0.00	0.11
Office Paper	0.00	0.00	0.00	0.10
Mixed Scrap Paper	1.51	1.16	0.31	1.08
Other Paper	0.81	1.09	9.35	0.50
PLASTIC				
PET Bottles	0.00	0.00	0.00	0.01
HDPE Bottles	0.00	0.00	0.00	0.00
Expanded Polystyrene	0.30	0.13	0.03	0.11
Plastic Packaging	2.14	1.89	0.14	5.72
Other Plastic Products	0.42	0.98	6.27	0.69
GLASS				
Nonrefillable Beer	0.00	0.19	0.00	0.00
Refillable Beer	0.00	0.00	0.00	0.00
Nonrefillable Pop	0.05	0.71	0.40	0.15
Refillable Pop	0.00	0.00	0.00	0.00
Container Glass	0.02	0.24	0.00	0.04
Nonrecyclable Glass	3.62	0.01	0.00	0.17
METAL				
Aluminum Cans	0.03	0.30	0.29	0.13
Aluminum Containers	0.01	0.05	0.00	0.01
Tin Cans	0.02	0.00	0.00	0.00
Bi-metal Cans	0.00	0.00	0.00	0.00
Ferrous Metals	1.13	5.04	0.37	8.56
White Goods	10.10	0.00	0.00	7.45
Nonferrous Metals	0.01	0.24	0.00	0.00
Mixed Metals/Materials	1.46	3.94	0.06	2.55
RUBBER				
Rubber Products	4.28	1.68	0.00	0.42
Tires	0.00	0.64	0.00	0.00
ORGANICS				
Food	1.64	0.33	0.10	2.04
Prunings	20.57	17.01	27.49	11.71
Leaves and Grass	5.29	3.08	8.85	15.18
Wood	22.45	38.21	29.42	31.66
OTHER				
Disposable Diapers	0.00	0.00	0.00	0.00
Textiles	1.18	1.50	9.36	0.56
Leather	0.00	0.00	0.00	0.00
Ash	0.00	0.00	0.00	0.00
Ceramics, Porcelain, China	0.00	0.00	0.00	0.03
Rocks, Concrete, Bricks	1.46	0.00	0.00	3.63
Soil, Dirt, Non-distinct Fines	2.29	6.34	0.00	1.55
Gypsum Drywall	10.80	2.29	0.00	0.41
Fiberglass Insulation	0.35	0.00	0.00	0.00
Construction Debris	5.19	6.58	0.29	2.28
HAZARDOUS				
Latex Paints	0.08	0.00	0.00	0.00
Adhesives, Glues	0.03	0.04	0.00	0.01
Oil-based Paints	0.02	1.22	0.00	0.00
Cleaners	0.00	0.00	0.03	0.01
Pesticides	0.00	0.00	0.00	0.00
Batteries	0.00	0.00	0.00	0.00
Gasoline	0.01	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.02	0.29	0.00	0.04
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00
Other Chemicals	0.00	0.00	0.00	0.00
NUMBER OF SAMPLES REPRESENTED:	15	10	10	12

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-8

SELF-HAUL RESIDENTIAL TRUCKS BY SEASON

	WINTER	SPRING	SUMMER	FALL
	%	%	%	%
PAPER				
Newspaper	1.34	0.37	1.76	0.48
Corrugated Paper	1.96	1.82	1.88	4.88
Computer Paper	0.00	0.21	0.04	0.00
Office Paper	0.09	0.00	0.44	0.12
Mixed Scrap Paper	3.22	2.43	2.45	0.97
Other Paper	1.65	0.93	0.72	0.46
PLASTIC				
PET Bottles	0.09	0.02	0.01	0.00
HDPE Bottles	0.04	0.03	0.00	0.01
Expanded Polystyrene	0.04	0.04	0.20	0.07
Plastic Packaging	1.06	0.72	0.44	0.64
Other Plastic Products	3.34	1.88	1.16	1.62
GLASS				
Nonrefillable Beer	0.04	0.15	0.28	0.68
Refillable Beer	0.00	0.08	0.07	0.00
Nonrefillable Pop	0.21	0.02	0.07	0.14
Refillable Pop	0.00	0.00	0.00	0.01
Container Glass	0.56	0.70	0.37	0.26
Nonrecyclable Glass	1.38	0.46	0.17	0.37
METAL				
Aluminum Cans	0.01	0.48	0.07	0.03
Aluminum Containers	0.01	0.01	0.01	0.00
Tin Cans	0.12	0.31	0.13	0.18
Bi-metal Cans	0.00	0.00	0.00	0.00
Ferrous Metals	8.00	4.39	4.22	3.28
White Goods	0.00	0.00	0.00	0.33
Nonferrous Metals	0.20	1.56	0.52	0.15
Mixed Metals/Materials	3.32	6.06	2.20	5.10
RUBBER				
Rubber Products	0.30	1.12	1.00	0.28
Tires	0.04	1.72	1.15	0.01
ORGANICS				
Food	1.32	0.35	0.55	6.18
Prunings	18.49	15.30	18.68	17.15
Leaves and Grass	17.20	4.65	3.67	6.56
Wood	30.24	16.91	23.06	20.39
OTHER				
Disposable Diapers	0.00	0.15	0.02	0.00
Textiles	2.46	5.67	7.48	9.39
Leather	0.08	0.05	0.11	0.10
Ash	0.17	0.00	0.00	0.00
Ceramics, Porcelain, China	0.16	1.73	0.01	2.78
Rocks, Concrete, Bricks	0.76	2.72	3.93	4.49
Soil, Dirt, Non-distinct Fines	5.35	3.86	8.63	3.36
Gypsum Drywall	0.82	3.73	0.35	5.65
Fiberglass Insulation	0.00	0.25	0.00	1.61
Construction Debris	0.68	16.36	11.44	0.00
HAZARDOUS				
Latex Paints	0.02	0.00	1.09	0.00
Adhesives, Glues	0.01	0.06	0.04	0.00
Oil-based Paints	0.01	0.25	0.45	1.89
Cleaners	0.02	0.03	0.01	0.02
Pesticides	0.00	0.00	0.00	0.00
Batteries	0.00	0.63	0.95	0.35
Gasoline	0.00	0.00	0.01	0.00
Motor Oil, Diesel Oil	0.02	1.56	0.12	0.00
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00
Other Chemicals	0.16	0.22	0.03	0.00
NUMBER OF SAMPLES REPRESENTED:	20	23	26	25

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE S-9

SELF-HAUL AUTOS BY SEASON

	WINTER	SPRING	SUMMER	FALL
	%	%	%	%
PAPER				
Newspaper	0.45	0.61	2.96	0.84
Corrugated Paper	3.07	4.37	2.93	4.16
Computer Paper	0.00	0.00	0.00	0.00
Office Paper	0.00	0.00	0.03	0.36
Mixed Scrap Paper	1.76	5.42	1.67	6.18
Other Paper	0.78	1.45	0.66	2.02
PLASTIC				
PET Bottles	0.10	0.02	0.02	0.00
HDPE Bottles	0.03	0.13	0.01	0.00
Expanded Polystyrene	0.40	0.12	0.03	0.05
Plastic Packaging	1.10	1.39	0.61	0.66
Other Plastic Products	2.18	1.31	1.63	1.18
GLASS				
Nonrefillable Beer	0.11	0.15	0.57	0.00
Refillable Beer	0.00	0.00	1.77	0.00
Nonrefillable Pop	0.01	0.10	0.06	0.00
Refillable Pop	0.00	0.00	0.14	1.22
Container Glass	0.24	0.33	0.51	0.06
Nonrecyclable Glass	3.79	0.23	0.16	0.01
METAL				
Aluminum Cans	0.11	0.05	0.11	0.00
Aluminum Containers	0.01	0.02	0.00	0.00
Tin Cans	0.24	0.40	0.10	0.17
Bi-metal Cans	0.00	0.00	0.00	0.04
Ferrous Metals	5.51	2.81	9.24	1.37
White Goods	0.00	0.00	0.10	0.00
Nonferrous Metals	0.38	0.12	0.28	0.51
Mixed Metals/Materials	1.55	6.86	5.01	3.42
RUBBER				
Rubber Products	0.18	0.49	1.27	0.16
Tires	0.00	0.37	0.02	0.00
ORGANICS				
Food	3.13	0.73	2.71	1.77
Prunings	11.84	12.27	22.07	1.65
Leaves and Grass	18.05	11.73	9.31	21.67
Wood	26.25	8.04	13.36	13.05
OTHER				
Disposable Diapers	0.18	0.23	0.00	0.00
Textiles	3.69	5.70	4.95	8.25
Leather	0.00	0.01	0.45	0.05
Ash	1.21	0.23	0.00	0.00
Ceramics, Porcelain, China	0.05	1.04	0.17	1.31
Rocks, Concrete, Bricks	1.53	1.11	12.91	15.40
Soil, Dirt, Non-distinct Fines	5.62	20.88	0.82	5.68
Gypsum Drywall	0.76	8.40	1.21	8.07
Fiberglass Insulation	0.01	0.96	0.00	0.00
Construction Debris	3.17	0.25	0.04	0.10
HAZARDOUS				
Latex Paints	0.78	0.00	0.32	0.00
Adhesives, Glues	0.01	0.01	0.22	0.00
Oil-based Paints	0.05	0.03	0.14	0.06
Cleaners	0.02	0.00	0.01	0.00
Pesticides	0.04	0.00	0.00	0.00
Batteries	1.20	1.63	0.77	0.14
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.43	0.01	0.02	0.02
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.02	0.00
Other Chemicals	0.00	0.00	0.59	0.35
NUMBER OF SAMPLES REPRESENTED:	20	20	20	16

VI. THE COMMERCIAL WASTE STREAM

SECTION VI. THE COMMERCIAL WASTE STREAM

A. COMPOSITION

RANDOM SAMPLES

A total of 97 random loads were sampled between April, 1988 and February, 1989. Composition estimates have been calculated for two different truck types: 1) front/rear loaders, and 2) roll-off containers. There are dramatic differences in average total load weights between these two truck types. Also, there are distinct variations in some of the waste stream components. Therefore, the overall commercial composition estimate is a weighted combination of the composition/quantity estimates for each truck type. Table C-1 provides general information regarding these samples.

Table C-2 presents a single, weighted set of component percentages for all commercial wastes sampled. Of the 97 samples, 78% were roll-off containers. The proportion of total waste, however, contributed by these types of containers amounts to only 57%. Consequently, Table C-2 data is weighted; roll-off container and front/rear loader data is adjusted to reflect the respective contribution of each to the estimated total commercial quantity disposed. Tables C-3 and C-4 present composition estimates for the two different truck types.

PURE SAMPLES

An additional 24 "commercial pure" samples were sorted in order to collect data for specific types of commercial generators. Predetermined groups, organized by Standard Industrial Classification (SIC) codes were sampled.

Sampling results for these "commercial pure" loads are presented in the Appendix under Commercial Waste Stream Sampling. Only three samples were sorted for each SIC grouping; consequently, data are not expected to be precise. These data were not used to calculate composition estimates.

B. QUANTITY

At the time of this report, the most accurate source of commercial quantity data was the Seattle Engineering Department, Solid Waste Utility, Waste Reduction, Recycling and Disposal Alternatives Final Environmental Impact Statement, July, 1988. Wastes disposed by the commercial substream were expected to be in excess of 225,000 tons during 1988.

With the additional amount of commercial tonnage recorded as self-haul, the total quantity of commercial waste used in this report becomes 230,780 tons.

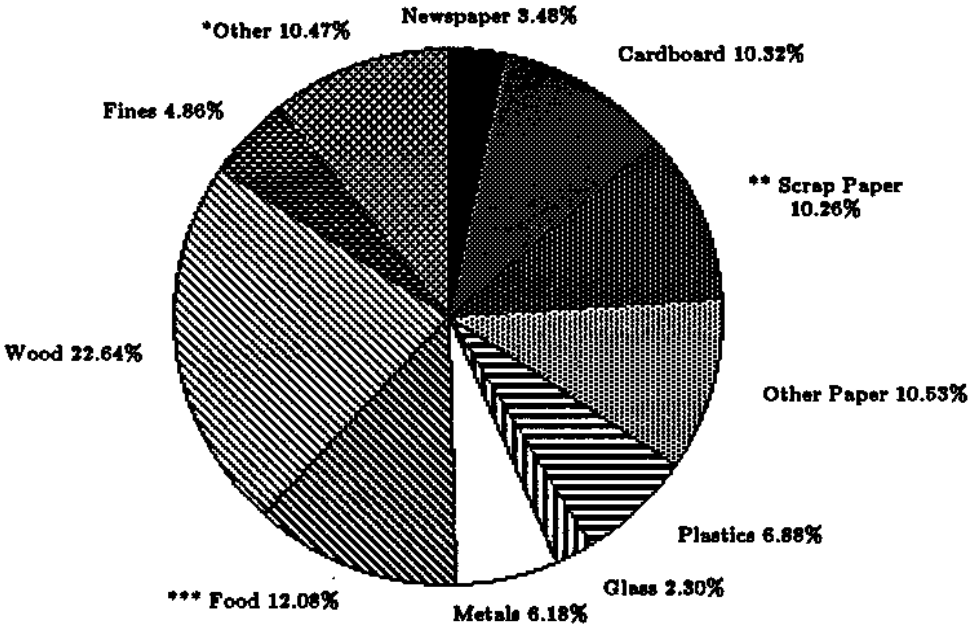
C. POINT OF SAMPLING

Commercial loads destined for one of the two private transfer stations were diverted for commercial waste substream sampling. Recycling may have occurred upstream at individual businesses from which the waste was collected. High grade loads were also hauled directly to processing centers. Limited recycling activities also occur downstream from sampling at the private transfer stations before disposal. (See Figure C-2)

Figure C - 1

WASTE COMPONENT PERCENTAGES BY WEIGHT

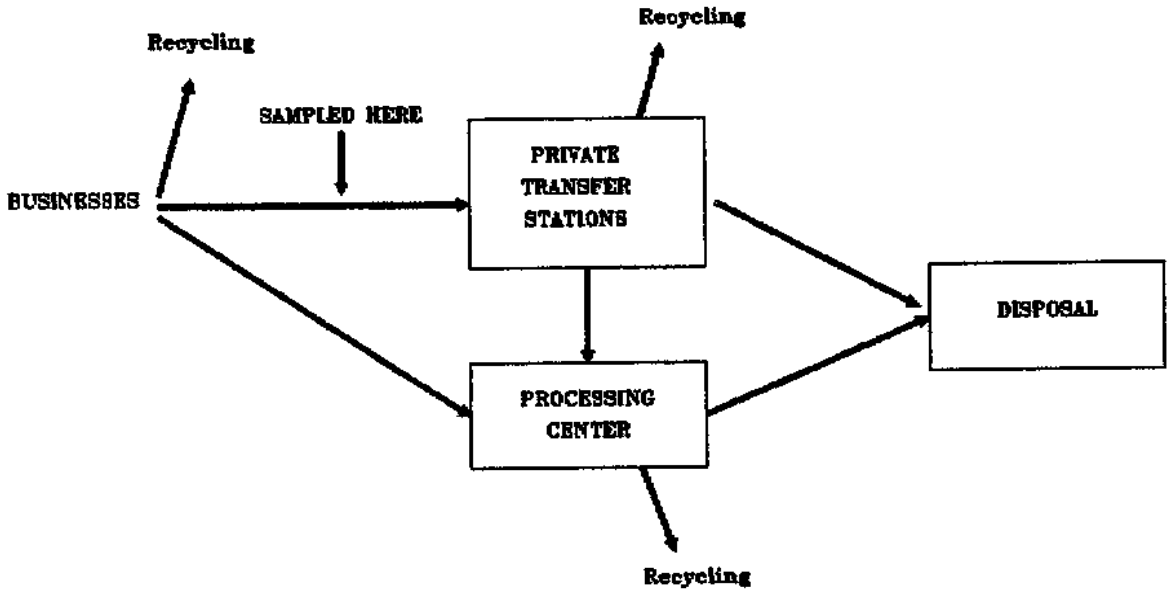
COMMERCIAL DISPOSED



* Drywall 1.97%, Textiles 1.87%, Construction Debris 1.49%, Rock/Concrete/Brick 1.24%, Hazardous 0.40%, Misc. 3.50%
** Includes computer and office paper
*** Includes some containers

Figure C - 2

POINT OF COMMERCIAL SAMPLING IN WASTE STREAM



SEATTLE WASTE COMPOSITION STUDY
SAMPLING INFORMATION
COMMERCIAL RANDOM SAMPLES

TABLE C-1

GENERAL INFORMATION

Sampling Period: April, 1988 through February, 1989

Total Number of Samples: 97*

Average Sample Weight(pounds):	322.2*	Sum of Sample Weights(pounds):	31,255.8
Average Total Load Weight:	8,296	Sum of Total Load Weights:	804,725

LOAD DISTRIBUTION BY TRUCK TYPE

Number of Samples From Front/Rear Loaders:	21	Number of Samples From Roll-Offs:	76
Average Total Load Weight Front/Rear Loaders (pounds):	16,431	Average Total Load Weight Roll-Offs (pounds):	6,048
Average Total Sample Weight:	263.3	Average Total Sample Weight:	336.5
Sum of Total Load Weights:	329,060	Sum of Total Load Weights:	459,665
Sum of Total Sample Weights:	9,529.2	Sum of Total Sample Weights:	25,726.6

LOAD DISTRIBUTION BY GENERATOR

Generator:	Total Samples	Number of Front/Rear Trucks	Number of Roll-Off Trucks
A. Manufacture:	21	0	21
B. Wholesale:	16	0	16
C. Retail:	4	0	4
D. Restaurant:	2	0	2
E. Hotel/Motel/Inn:	4	0	4
F. Office:	2	0	2
G. Health Services:	0*	0	0
H. Education:	0*	0	0
I. Transportation:	8	0	8
J. Other Services:	10	0	10
K. Mixed Generator:	22	20	2
X. Unknown	8	1	7
TOTALS:	**97**	**21**	**76**

* Predetermined amounts or distributions

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE C-2

WEIGHTED COMMERCIAL April, 1988 through March, 1989
FRONT/REAR LOAD and ROLL-OFF TRUCKS

	%
PAPER	
Newspaper	3.48
Corrugated Paper	10.32
Computer Paper	0.45
Office Paper	1.17
Mixed Scrap Paper	8.64
Other Paper	10.53
PLASTIC	
PET Bottles	0.07
HDPE Bottles	0.30
Expanded Polystyrene	0.54
Plastic Packaging	5.02
Other Plastic Products	0.95
GLASS	
Nonrefillable Beer	0.50
Refillable Beer	0.16
Nonrefillable Pop	0.41
Refillable Pop	0.05
Container Glass	1.10
Nonrecyclable Glass	0.08
METAL	
Aluminum Cans	0.56
Aluminum Containers	0.09
Tin Cans	0.53
Bi-metal Cans	0.01
Ferrous Metals	2.68
White Goods	0.03
Nonferrous Metals	0.12
Mixed Metals/Materials	2.16
RUBBER	
Rubber Products	0.27
Tires	0.00
ORGANICS	
Food	12.08
Prunings	0.96
Leaves and Grass	1.05
Wood	22.64
OTHER	
Disposable Diapers	0.57
Textiles	1.87
Leather	0.02
Ash	0.14
Ceramics, Porcelain, China	0.19
Rocks, Concrete, Bricks	1.24
Soil, Dirt, Non-distinct Fines	4.86
Gypsum Drywall	1.97
Fiberglass Insulation	0.30
Construction Debris	1.49
HAZARDOUS	
Latex Paints	0.05
Adhesives, Glues	0.18
Oil-based Paints	0.04
Cleaners	0.03
Pesticides	0.01
Batteries	0.02
Gasoline	0.00
Motor Oil, Diesel Oil	0.06
Asbestos	0.00
Explosives	0.00
Other Chemicals	0.01

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE C-3

COMMERCIAL April, 1988 through September, 1988
ROLL-OFF TRUCKS

	Mean Percentages and Ranges at the 90% Confidence Level			
	%	±	Low	High
PAPER				
Newspaper	1.34	0.57	0.77	1.91
Corrugated Paper	11.09	2.54	8.56	13.63
Computer Paper	0.60	0.32	0.28	0.92
Office Paper	0.99	0.49	0.51	1.48
Mixed Scrap Paper	5.55	2.54	3.01	8.09
Other Paper	9.41	3.50	5.91	12.91
PLASTIC				
PET Bottles	0.10	0.09	0.01	0.19
HDPE Bottles	0.46	0.48	-0.02	0.95
Expanded Polystyrene	0.36	0.19	0.17	0.55
Plastic Packaging	3.87	0.98	2.89	4.85
Other Plastic Products	1.22	0.55	0.67	1.77
GLASS				
Nonrefillable Beer	0.26	0.18	0.08	0.43
Refillable Beer	0.12	0.09	0.03	0.22
Nonrefillable Pop	0.30	0.17	0.13	0.47
Refillable Pop	0.01	0.02	0.00	0.03
Container Glass	0.61	0.43	0.18	1.04
Nonrecyclable Glass	0.11	0.08	0.03	0.19
METAL				
Aluminum Cans	0.34	0.23	0.11	0.57
Aluminum Containers	0.06	0.04	0.03	0.10
Tin Cans	0.23	0.11	0.12	0.34
Bi-metal Cans	0.01	0.01	0.00	0.01
Ferrous Metals	3.42	1.11	2.31	4.53
White Goods	0.06	0.10	-0.04	0.16
Nonferrous Metals	0.21	0.16	0.05	0.36
Mixed Metals/Materials	3.46	2.27	1.19	5.74
RUBBER				
Rubber Products	0.40	0.32	0.08	0.72
Tires	0.00	0.00	0.00	0.00
ORGANICS				
Food	3.85	2.81	1.04	6.66
Prunings	0.46	0.42	0.04	0.88
Leaves and Grass	1.00	1.58	-0.59	2.58
Wood	33.61	7.31	26.30	40.92
OTHER				
Disposable Diapers	0.01	0.01	0.00	0.03
Textiles	1.94	0.94	1.00	2.88
Leather	0.04	0.05	-0.01	0.09
Ash	0.25	0.38	-0.13	0.63
Ceramics, Porcelain, China	0.31	0.30	0.01	0.61
Rocks, Concrete, Bricks	2.17	3.15	-0.99	5.32
Soil, Dirt, Non-distinct Fines	4.95	3.07	1.89	8.02
Gypsum Drywall	3.21	2.35	0.86	5.56
Fiberglass Insulation	0.52	0.81	-0.30	1.33
Construction Debris	2.55	2.80	-0.25	5.35
HAZARDOUS				
Latex Paints	0.04	0.03	0.01	0.07
Adhesives, Glues	0.31	0.47	-0.16	0.77
Oil-based Paints	0.07	0.04	0.03	0.11
Cleaners	0.01	0.01	0.00	0.02
Pesticides	0.01	0.01	0.00	0.01
Batteries	0.02	0.02	0.00	0.04
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.06	0.08	-0.02	0.14
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.01	0.00	0.01
Other Chemicals	0.01	0.02	-0.01	0.04

NUMBER OF SAMPLES REPRESENTED: 76

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE C-4

COMMERCIAL April, 1988 through February, 1989
FRONT/REAR LOAD TRUCKS

	Mean Percentages and Ranges at the 90% Confidence Level			
	%	±	Low	High
PAPER				
Newspaper	6.33	4.57	1.76	10.90
Corrugated Paper	9.29	3.57	5.72	12.86
Computer Paper	0.26	0.16	0.10	0.41
Office Paper	1.40	0.95	0.45	2.34
Mixed Scrap Paper	12.75	5.07	7.68	17.81
Other Paper	12.03	3.76	8.27	15.79
PLASTIC				
PET Bottles	0.04	0.03	0.01	0.07
HDPE Bottles	0.08	0.07	0.01	0.15
Expanded Polystyrene	0.79	0.24	0.55	1.03
Plastic Packaging	6.56	1.56	4.99	8.12
Other Plastic Products	0.58	0.36	0.21	0.94
GLASS				
Nonrefillable Beer	0.82	0.36	0.46	1.18
Refillable Beer	0.21	0.25	-0.04	0.46
Nonrefillable Pop	0.55	0.31	0.24	0.86
Refillable Pop	0.10	0.16	-0.06	0.25
Container Glass	1.75	0.80	0.95	2.56
Nonrecyclable Glass	0.05	0.04	0.01	0.08
METAL				
Aluminum Cans	0.85	0.43	0.41	1.28
Aluminum Containers	0.14	0.07	0.07	0.21
Tin Cans	0.94	0.46	0.48	1.39
Bi-metal Cans	0.01	0.01	0.00	0.02
Ferrous Metals	1.69	1.08	0.62	2.77
White Goods	0.00	0.00	0.00	0.00
Nonferrous Metals	0.00	0.00	0.00	0.00
Mixed Metals/Materials	0.43	0.32	0.10	0.75
RUBBER				
Rubber Products	0.09	0.07	0.02	0.16
Tires	0.00	0.00	0.00	0.00
ORGANICS				
Food	23.03	12.62	10.41	35.65
Prunings	1.62	1.51	0.10	3.13
Leaves and Grass	1.12	1.18	-0.06	2.31
Wood	8.04	3.92	4.13	11.96
OTHER				
Disposable Diapers	1.31	1.31	0.00	2.61
Textiles	1.77	1.74	0.03	3.51
Leather	0.00	0.00	0.00	0.00
Ash	0.00	0.00	0.00	0.00
Ceramics, Porcelain, China	0.02	0.02	0.00	0.03
Rocks, Concrete, Bricks	0.01	0.01	-0.01	0.02
Soil, Dirt, Non-distinct Fines	4.75	2.85	1.90	7.60
Gypsum Drywall	0.33	0.33	-0.01	0.66
Fiberglass Insulation	0.00	0.00	0.00	0.00
Construction Debris	0.08	0.13	-0.05	0.21
HAZARDOUS				
Latex Paints	0.06	0.08	-0.02	0.14
Adhesives, Glues	0.00	0.00	0.00	0.00
Oil-based Paints	0.01	0.01	0.00	0.02
Cleaners	0.06	0.07	0.00	0.13
Pesticides	0.00	0.00	0.00	0.00
Batteries	0.02	0.02	0.00	0.04
Gasoline	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.06	0.10	-0.04	0.17
Asbestos	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00
Other Chemicals	0.00	0.00	0.00	0.00

NUMBER OF SAMPLES REPRESENTED: 21

APPENDIX

CITY OF SEATTLE
DEPARTMENT OF ENGINEERING
SOLID WASTE UTILITY

1988/1989

WASTE STREAM COMPOSITION STUDY

FINAL REPORT

APPENDIX

Description of Methodology

Prepared by:

The Matrix Management Group

Herrera Environmental Consultants

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Fernandes Associates, and

Gilmore Research Group

In cooperation with:

Solid Waste Utility Staff

Printed of Recycled Paper

June 1989

i. TABLE OF CONTENTS

CITY OF SEATTLE
SOLID WASTE UTILITY

WASTE STREAM COMPOSITION STUDY

FINAL REPORT

APPENDIX

Description of Methodology

TABLE OF CONTENTS

I.	INTRODUCTION TO THIS APPENDIX		1
II.	PROCEDURES COMMON TO ALL SUBSTREAM ANALYSES		
	A.	RANDOM PRE-SELECTION OF SAMPLES	1
	B.	FIELD SAMPLING PROCEDURES	1
	C.	FIELD SAMPLING TALLY FORM	2
III.	RESIDENTIAL WASTE STREAM SAMPLING		
	A.	OBJECTIVE	7
	B.	SAMPLE SELECTION	7
	C.	HAULER AND TRANSFER STATION PARTICIPATION	8
	D.	DEMOGRAPHIC AND ROUTE INFORMATION	9
	E.	RESIDENTIAL SAMPLING FORMS	10
IV.	SELF-HAUL WASTE STREAM SAMPLING		
	A.	OBJECTIVE	15
	B.	SAMPLE SELECTION	15
	C.	TRANSFER STATION AND CUSTOMER PARTICIPATION	16
	D.	SELF-HAUL SAMPLING FORMS	16
V.	COMMERCIAL WASTE STREAM SAMPLING		
	A.	OBJECTIVE	21
	B.	SAMPLE SELECTION	21
	C.	HAULER & TRANSFER STATION PARTICIPATION	22
	D.	ROUTE INFORMATION	23
	E.	COMMERCIAL PURE LOADS	23
	F.	COMMERCIAL SAMPLING FORMS	26
VI.	MONTHLY SAMPLING SUMMARIES		
	A.	GENERAL COMMENTS	41
	B.	SAMPLING SCHEDULES	47
	C.	DATABASE FIELD DESCRIPTIONS	59

I. INTRODUCTION TO THIS APPENDIX
II. PROCEDURES COMMON TO ALL SUBSTREAM ANALYSES

SECTION I. INTRODUCTION TO THIS APPENDIX

This Appendix to the Final Report details the various sampling methodologies followed for the City of Seattle's Waste Stream Composition Study.

This Appendix is intended as a detailed supplement to the Final Report. All composition estimates appear in the Final Report.

SECTION II. PROCEDURES COMMON TO ALL SUBSTREAM ANALYSES

A. RANDOM PRESELECTION OF SAMPLES

The residential, commercial, and self-haul waste streams were sampled by randomly selecting truckloads, extracting, and sorting a segment (approximately 300 pounds) of the load selected.

In the residential and commercial substudies, the random sample for the 12-month sampling year was generated at the outset of the study. By pre-identifying the specific truckloads of waste to be sorted, the consultant team, the haulers, and City staff were able to prepare logistically for the sorting process, and efficiently obtain descriptive data on waste generation.

For the self-haul substudy, it was not possible to preselect actual truckloads, due to the nature of the self-haul process. In order to assure the statistical validity of the self-haul sample, sampling <u>days</u> were selected at random, and trucks were systematically selected according to the sequence of their arrival at the transfer stations.

B. FIELD SAMPLING PROCEDURES

FIELD SUPERVISION

Field supervisors and sorting crews were provided by Herrera Environmental Consultants for residential samplings, R.W. Beck and Associates for commercial samplings, and Matrix Management Group for self-haul samplings. All field supervisors followed the same basic protocol. Training and overall program supervision was provided by the Matrix Management Group.

SAMPLE SELECTION

When a designated truck arrived at the transfer station, the entire truckload of waste was dumped onto a concrete pad. An imaginary 8-section 2-layer grid (16 cells total) was superimposed on the load. Then a randomly selected cell was identified for sampling. Approximately 300 pounds of waste were extracted from the designated cell and laid on a clean tarp.

SORTING AND WEIGHING

Initially, each sample was sorted into the major component groups. As these piles accumulated, the supervisor monitored the purity of these groups in preparation for final sorting.

Major groups were then carefully sorted into the specific component categories for weighing and recording. Baskets were normally used for cans, bottles, and food, and other components, depending on the nature of the sample. Clear polyethylene bags were also used to contain component samples. Clear plastic and open baskets allowed the supervisor to see the material and verify sample purity.

Each sample was sorted to the greatest reasonable detail, until no more than a small amount of homogeneous material remained. The amount and composition of this "supermix" varied. Generally, "supermix" consisted of mixed fines and pieces of waste material smaller than two inches square. All samples were sorted down as far as practical. The overall goal was to sort the entire sample directly into the component categories, leaving no supermix at all.

All remaining supermix was combined and the total weight recorded. Approximately 20% by weight of the total supermix was then selected as a subsample. This "supermix" sample was sorted and weighed, using the "supermix categories" listed on the sampling sheet. Based on this subsample, "supermix" categories weights were calculated and added to the overall sample weights.

C. FIELD SAMPLING TALLY FORM

Exhibit II-C is the recording form used in the field for each sample.

SEATTLE WASTE COMPOSITION STUDY

Single Sample Results

Date:_____ Destination_____ Load Number_____

Route #:_____am / pm Truck #:_____ Load Type_____

Tare Tray Only_____ Tare W/Basket_____ Sample Cell #_____

COMPONENTS:	WEIGHT MEASUREMENTS:					
PAPER:						
Newspaper						
Corrugated paper						
Computer paper						
Office paper						
Mixed scrap paper						
Nonrecyclable paper						
Disposable diapers						
PLASTICS:						
PET bottles						
Milk/juice containers						
Styrofoam						
N/R plastic packaging						
Other plastic products						
GLASS:						
Nonrefillable Beer						
"Refillable" Beer						
Nonrefillable Pop						
"Refillable" Pop						
Container glass						
Nonrecyclable glass						

1

METALS:						
Aluminum cans						
Aluminum containers						
Tin cans						
Bi-metal cans						
Ferrous metals						
White goods						
Non-ferrous metals						
Mixed metals/materials						
RUBBER:						
Rubber products						
Tires						
ORGANIC:						
Food						
Yard waste: prunings						
Leaves and Grass						
OTHER:						
Wood						
Textiles						
Leather						
Ash						
Ceramics, porcelain, china						
Rock, concrete, bricks						
Sand, soil, dirt and nondistinct fines						
Gypsum drywall						
Fiberglass insulation						
Construction debris, other than wood						

HAZARDOUS SUBSTANCES, including spent or empty containers. Such as:						
Latex paint products						
Adhesives, glues, cements, sealants,						
Solvents, thinners, oil-based paints						
Cleaners						
Pesticides						
Batteries						
Gasoline						
Motor oil, diesel oil						
Asbestos						
Explosives						
Other chemicals						

SUPERMIX WEIGHTS (including SuperSample):		SuperSample COMPONENT WEIGHTS		%
		Mixed scrap paper		
		N/R plastics		
		Container glass		
		Mixed metals/materials		
		Food		
		Nondistinct fines		
TOTAL		TOTAL	=	100%

COMMENTS OR UNUSUAL CIRCUMSTANCES:

FORM 4/88

III. RESIDENTIAL WASTE STREAM SAMPLING

SECTION III. RESIDENTIAL WASTE STREAM SAMPLING

A. OBJECTIVE

The objective of the residential waste stream sampling was to provide statistically significant composition analyses for targeted components of waste for Seattle residents. The residential sector was disaggregated into single and multifamily substreams. "Single-family" included detached single-family houses, duplexes, triplexes and fourplexes using cans. "Multifamily" included, for the most part, apartments with five or more units using dumpsters.

B. SAMPLE SELECTION

A total of 216 truckloads of residential waste collected by City-contracted haulers was included in the residential sample--approximately nine truckloads per month at each of the City's transfer stations. Monthly sampling began in March, 1988 and concluded in February, 1989.

The entire sample was constructed in March, 1988, using the following procedure:

1. The two residential haulers holding City contracts provided information identifying every day, route, and truckload of waste hauled on their weekly collection schedules. For each transfer station and hauler, the total "population" of loads included:

   - all single-family truckloads identified by day of week, route number, and a.m. or p.m. pickup (first or second run of the truck),
   - all multifamily (dumpster) truckloads, identified by day of week, route number, and a.m. or p.m. pickup,
   - all truckloads which contained residential waste deposited both in cans and dumpsters ("mixed" truckloads), identified by day of week, route number, and a.m. or p.m. pickup.

   [Note that the "population" from which the sample was constructed was truckloads and not individuals, families, housing units, or neighborhoods. For each truckload drawn into the sample, descriptive information was gathered about the households in the census tract from which the truck collected its load. See "Collecting and entering demographic data" in the section below.]

2. Two complete sets of truckloads, one for the North and one for the South Transfer Station, were entered into the computer database, with unique identifier codes for each load.

From each set, a 108-truckload sample was drawn, using a computerized random number generator. Each sample was arrayed by day of week.

3. For each sampling month, the full set of possible sampling days was entered into the computer, i.e., all weekdays excluding or adjusting for holidays and other known non-collection days.

4. Via the random number generator, a single day was selected from each month, resulting in a set of sampling days, such as:

March	4th	Friday
April	25th	Monday
etc.		

5. These randomly selected days were "assigned" alternately to the North and South Transfer Stations, thus:

March	4th	Friday	North
April	25th	Monday	South
etc.			

6. The day immediately following was assigned to the other transfer station, to facilitate efficient management of sorting crews and equipment, thus:

March	4th	Friday	North
March	7th	Monday	South
April	25th	Monday	South
April	26th	Tuesday	North
etc.			

Note that Friday's "contiguous day" is the following Monday.

7. Sample truckloads and sampling days were then matched so that approximately nine trucks were scheduled per sampling day at each transfer station.

C. HAULER AND TRANSFER STATION PARTICIPATION

The sampling schedules were given to each hauler. Prior to the sorting day (i.e., once a month), the hauler was requested to provide information about:

- o whether curbside recycling was in effect on each of the routes included in the sample,

- an estimation of the area of the route covered in the a.m. and p.m. runs on the sorting day, and

- the number of accounts included in the run on that day (or, alternatively, on the route as a whole).

As the sampling days approached, the hauler was provided with written procedures and requested to inform the drivers of trucks included in the sample. Each involved driver was then aware of the process to be followed upon entering the transfer station at the completion of his run.

Transfer station managers were also provided with the schedule of sampling days, the expected times of arrival for selected trucks, a description of the procedures to be used at the site, a request for cooperation, assistance as needed, and other pertinent information. The project manager worked out all the details of the truck diversion, sample extraction, sorting, and disposal of sorted waste with the transfer station manager at the beginning of each sorting day.

D. DEMOGRAPHIC AND ROUTE INFORMATION

Using haulers' route maps and information gathered from haulers on the a.m./p.m. division for each route, the 216 routes/runs in the sample were overlaid on a map of census tracts. The census tract(s) included in each sampled run was identified and included with each database record.

For each census tract, the following information was obtained:

- **household income**--median income per household in 1979, as reported in the 1980 census,

- **household size**--mean household size (number of persons per household) in 1980, and

- **education level**--proportion of individuals 18 years or older who have (a) completed zero to eleven years of schooling, (b) completed high school, (c) completed some post-secondary education, and (d) completed four or more years of post-secondary education, again as reported in the 1980 census.

For each route included in the residential sample, information was obtained from the hauler about the number of accounts served by the route and entered into the database. Analysts should bear in mind that this information must be treated with caution. Each route contained both a.m. and p.m. pick-ups, and the "line" differentiating the two varied from week to week, depending on the volume of waste collected during the a.m. run. The truck was filled during the a.m. run, and the remainder of the route was served after the a.m.

dumping at the transfer station. The sampled truckloads included only a portion of the route, a proportion which haulers were asked to estimate, but which may not have been possible to determine precisely, due to the variability of the waste volume.

E. RESIDENTIAL SAMPLING FORMS

Pre-established daily sampling schedules, typical of that shown in Exhibit III-E-1, were used for each day's sampling. Truck numbers, obtained from the haulers just prior to sampling, and sample cell numbers, generated randomly, were filled in before each sort.

Forms R1, R2, and R3 were used by the crew supervisor and gatehouse attendant to record a variety of information regarding each load from which a sample was drawn. These forms are included here as Exhibits III-2, 3, and 4, respectively.

EXHIBIT III-E-1

1988 SEATTLE SOLID WASTE STREAM COMPOSITION STUDY

- Residential Waste Sub-Stream Samples - NORTH TRANSFER STATION

MONTH	DATE	DAY	ROUTE	AM/PM	N/S-HAULER	SINGLE/MULTI-FAMILY LOAD	TRUCK NUMBER	CELL NUMBER
JUNE	28	T	2	AM	N	SINGLE		
			5	AM	N	SINGLE		
			8	AM	N	SINGLE		
			17	AM	N	SINGLE		
			1	PM	N	SINGLE		
			6	PM	N	SINGLE		
			12	PM	N	SINGLE		
			23	PM	N	SINGLE		
			29	PM	N	MULTI		

Form # R-1

SEATTLE SOLID WASTE COMPOSITION STUDY

Residential Hauler's Declaration of Route Information

Location: _____ Sampling Date: _____

Hauler	Route #	1st 2nd or 3rd run	Truck #	* Type of Load	Approx. Number of Accounts on Run				Curbside Recycling in effect on sampling day?	Census Tract(s) covered by run	Comments
					1st run	2nd run	3rd run	all			

* Codes for "Type of Load": S = single family, A = apt. houses and multi-family bldgs., M = mixed

Special conditions which may affect loads on this sampling day: _____

EXHIBIT III-E-3

Form # R-2

SEATTLE SOLID WASTE COMPOSITION STUDY

Transfer Station Gatehouse Weight Record

Location: _____ Sampling Date: _____

Hauler	Truck #	1st 2nd or 3rd Run	ETA at Transfer Station	Net Weight of Load	Comments

Form # R-_

SEATTLE SOLID WASTE COMPOSITION STUDY

Crew Supervisor's Daily Sampling Tally

Location: _____ Sampling Date: _____

Load #	Hauler	Route #	AM or PM Run	Truck #	Type of Load			ETA at transfer station	Take sample from Cell #	Sample results form attached (X)
					cans	dumpster	mixed			

Special conditions which may affect loads on this sampling day (use codes): _____

IV. SELF-HAUL WASTE STREAM SAMPLING

SECTION IV. SELF-HAUL WASTE STREAM SAMPLING

A. OBJECTIVE

The objective of the self-haul sampling task was to understand the sources and composition, and to identify target materials such as reusable items, recyclables, compostables, and hazardous waste in order to determine the economic feasibility of salvaging those materials from the waste stream.

B. SAMPLE SELECTION

The sampling of self-haul waste could not be preselected, given the nature of the self-haul process. However, it was possible to preselect the sampling sites, and predetermine the arrival sequence of the vehicles whose loads were included in the sample. Using 1987 monthly figures, the consultants determined the proportion of commercial and residential tonnages and the number of vehicles entering the transfer stations. Samples were based on vehicle counts at the North and South Transfer Stations.

At the City-operated North and South Transfer Stations, the method used was "systematic" sampling. The steps in the process were:

1. Sampling began in April, 1988 and concluded in February, 1989. Sampling was done in odd-numbered months (May, July, etc.) at the South Transfer Station, and in even-numbered months at the North Transfer Station.

2. From each sampling month, a random number generator was used to select a single sampling day from the full set of possible self-haul days (seven days a week less holidays when the transfer stations are closed).

3. The sampling days were compared to the residential and commercial waste sampling days, and substitutions were made for coinciding days, since the same equipment was used to perform residential, commercial, and self-haul sorting.

4. For each site, 16 to 18 self-haul loads were sampled on each sampling day. Those loads were selected from two subsets of vehicles arriving at the transfer station on the sample day: the subset of passenger vehicles, and the subset of trucks and vans. The proportion of passenger vehicle samples to truck and van samples was consistent with the proportion of those vehicle types anticipated by the transfer station manager (based on 1987 Seattle Solid Waste Utility figures) to arrive at the transfer station on the sample day.

5. When the number of samples to be pulled from each subset had been determined, that number ("n") was divided into the total number of that vehicle type expected to use

the transfer station on the sample day. The result of that division was termed "k". On the sampling day, every "kth" vehicle of each type was diverted to the sorting site.

6. In order to assure as random a sample as possible, the starting times at each site on each sample day were randomly selected from the first 90 minutes of operation at the site.

C. TRANSFER STATION AND CUSTOMER PARTICIPATION

Transfer station managers were provided with the sampling schedules and vehicle diversion guidelines appropriate to their sites. On the sampling day, gatehouse staff were responsible for identifying every "kth" vehicle from the two subsets of vehicle types (autos and trucks) arriving at the site. The driver was informed that the usual dump fee would be waived in exchange for his participation in the study. Each selected vehicle was tagged and instructed to enter the transfer station.

The crew supervisor would then briefly explain to the driver that a waste sampling project was being conducted for the City of Seattle, that his vehicle was randomly selected for inclusion in the study, and that anonymity was assured. The driver was asked whether he lived within the Seattle City limits, and if so, to identify the approximate street address from which the waste in his vehicle came. Census tracts were subsequently applied to each sample based on this address.

The supervisor asked the driver to complete the "Self-haul Driver's Questionnaire" as his vehicle was unloaded.

Some drivers selected for the sample may have brought all or part of their loads to the transfer station expressly for deposit in the recycling bins. These loads were dumped, examined, and weighed like any others in the sample. Recyclable materials were then placed in recycling bins.

D. SELF-HAUL SAMPLING FORMS

Exhibit IV-1, with one sheet each for autos and trucks, was used by the gatehouse attendant to count and select sample vehicles. A modified Form R2, shown in Exhibit IV-2, was also used by the attendant to record sample vehicle information.

After entering the transfer station, each sample customer was asked by the crew supervisor the questions on Page 1 of the Driver's Questionnaire (Form SH-6). If the sample turned out to be residential, the driver was also asked the questions on Page 2 of this form. This form appears in Exhibit IV-3.

1988-9 CITY OF SEATTLE SOLID WASTE STREAM COMPOSITION STUDY

- Self-Haul Load Sampling Procedures - NORTH TRANSFER STATION

FOR PASSENGER VEHICLE LOADS

MONTH	DATE	DAY	START-TIME	SAMPLING INTERVAL	REQUIRED NUMBER OF SAMPLE LOADS
OCT	26	WE	9:20 AM	EVERY 10TH VEHICLE	7

BEGINNING AT THE START-TIME, CIRCLE ONE NUMBER FOR EACH PASSENGER VEHICLE ENTERING STATION. WHEN YOU CIRCLE THE LAST NUMBER IN EACH BLOCK, THAT IS THE VEHICLE WHOSE LOAD SHOULD BE DUMPED ASIDE FOR SAMPLING.

CONTINUE FOR EACH BLOCK UNTIL THE REQUIRED NUMBER OF VEHICLES IS SAMPLED. IF THE TRANSFER STATION IS NEARING CLOSING TIME AND THE NUMBER OF SAMPLES TAKEN DOES NOT ADD UP TO THE REQUIRED NUMBER, THEN SAMPLE CONSECUTIVE/ALTERNATE LOADS UNTIL THE REQUIRED NUMBER IS REACHED.

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

EXHIBIT IV-2

Form # R-2

SEATTLE SOLID WASTE COMPOSITION STUDY

Transfer Station Gatehouse Weight Record
(For Self-haul)

Location: _____ Sampling Date: _____

Description: Vehicle & License #	Vehicle Type 1. Pass.Car 2. P.U./Van 3. Other	Time of Arrival	Gross Weight	Tare Weight	Net Weight	COMMENTS

SH-6

City of Seattle
Self-Haul Waste Analysis

DRIVER'S QUESTIONNAIRE

****

Project Supervisor fills out this section --

Location: _____ Date: _____ Vehicle #: _____

Weather conditions: _____

Other special conditions/
events affecting load: _____

(For residential loads only:) Load was generated in census tract # _____

****

Driver fills out this section --

1. Type of vehicle: ____ passenger ____ pick-up / van ____ other truck

2. Type of waste: _____ residential _____ commercial, institutional, manufacturing

for residential

3. Does this waste come from a:

_____ single family house

_____ house/bldg. with 2 to 4 units

_____ bldg. with 5 or more units

RESIDENTIAL CUSTOMERS
PLEASE CONTINUE ON
NEXT PAGE

for commercial:

3. Does this waste come from a:

_____ manufacturer

_____ wholesaler

_____ retailer

_____ restaurant / eatery

_____ hotel / motel / inn

_____ office - private or govt.

_____ health facility

_____ educational institution

_____ transportation shop

_____ other service (beauty shop, landscaper, laundry, elec. repair, cinema, theater, church, commercial sports, zoo, etc.

page 1

SH-6

THE REMAINING QUESTIONS ARE FOR RESIDENTIAL CUSTOMERS ONLY --

4. Do you participate in a recycling program?

_____ yes _____ no _____ don't know

5. (If yes) What kind of a program is it?

_____ City's curbside recycling program

_____ take recycables to neighborhood collection site: _____ (location)

_____ recyclables collected by: _____ (name of recycling business)

_____ bring recyclables to transfer station (be sure to answer Q #6)

_____ other (describe): _____

_____

6. Did you bring this load to the transfer station today to deposit in the recycling bins?

_____ yes, entire load

_____ no, not appropriate for and/or not separated for recylcling

_____ yes, part of this load. Describe portion intended for recycling:

_____

7. What do you think is the most compelling reason for recycling?

_____ It protects the environment from pollution.

_____ It conserves resources.

_____ I can get money for recyclable materials

_____ other: _____

8. (For those who do not recycle now:) What would you say are the reasons you are not recycling now?

_____ no place / not enough room / to store recyclables

_____ no convenient way to dispose of recyclables

_____ don't have much recyclable waste / not worth it

_____ too much trouble / too messy

_____ other reason (describe:) _____

_____

V. COMMERCIAL WASTE STREAM SAMPLING

SECTION V. COMMERCIAL WASTE STREAM SAMPLING

A. OBJECTIVE

The objective of the commercial/institutional waste stream sampling task was to fully understand the character and quantities of waste produced by the highest volume, non-residential waste generators in the City of Seattle. The task included two methods: sampling of "regular" commercial waste loads and of "pure loads" collected from targeted groups of generators.

Subsections B through D below address randomly sampled waste collected by commercial haulers on their regularly scheduled routes. The supplemental examination of "pure loads" collected for this study from specific types of major commercial/institutional generators, is described in Subsection E.

B. SAMPLE SELECTION

A total of 97 truckloads of commercial waste collected by the two major haulers was randomly selected. Approximately 20 loads were sampled during each of the first three months. Ten loads were then sampled every other month for the next eight months. The bulk of the sampling took place in the first three months to satisfy the Solid Waste Utility's need for this data. Monthly sampling began in April, 1988 and concluded in February, 1989.

By mid-April, 1988, the entire sample was constructed using the following procedure:

1. The two major commercial haulers provided information identifying every day, route, truckload, and transfer site for waste hauled on their regularly scheduled routes. For each hauler, the total "population" of loads included:

    - o all front loader "mixed" loads identified by hauler, day of week, route number, and load number;
    - o all rolloff container loads identified by hauler, day of week, route number, and load number on route; and
    - o all rear loader "mixed" loads identified by hauler, day of week, route number, and load number.

    [Note: Commercial sampling should have been stratified by vehicle type so that the number of samples taken from each vehicle type reflected the anticipated contribution by weight being hauled by each of these vehicle types.]

2. All of the truckloads, from both haulers, were combined into a single "population" for sample selection. Each truckload had a unique identifier code. A 100-truckload sample was drawn through random number generation. Each sample was arrayed by day of week and name of hauler.

3. For each sampling month (April, May, June, August, October, December, and February), the full set of sampling days was entered into the computer database; i.e., all known collection days.

4. Via the same random number generator, a single day was selected from each month--the same process as used for residential sampling.

5. Sample truckloads and sampling days were then matched so that 10 trucks were scheduled per sampling day.

6. "Make-up" days were allowed when any complications arose which prevented completion of the sample sorting.

C. HAULER AND TRANSFER STATION PARTICIPATION

The sample and sampling schedules were communicated to the hauler, as described previously. Prior to each sorting day(s) (i.e., once per sorting month), the hauler was requested to fill out an information sheet for each load.

Due to space limitations at the private transfer sites of both commercial haulers, and through agreement with and approval by the Seattle Solid Waste Utility, sorting of the commercial loads took place at both of the City's transfer stations. For purposes of this study, privately hauled commercial waste loads which would normally be tipped at one of two private transfer stations, were allowed to dump at the City-owned transfer stations free of charge. This disposal fee allowance was to compensate the private haulers for the extra time required to divert loads.

The hauler was provided with written procedures and requested to inform the drivers of the truckloads to be included in the sample as the sampling days approached. Each driver was thus aware of the process to be followed for the selected loads.

The South and North Transfer Station managers were provided with the schedule of sampling days, the expected times of arrival of selected trucks, and a description of procedures to be used at the site.

D. ROUTE INFORMATION

For each load included in the commercial sample, the following information was obtained from the hauler:

- Route number
- Truck number
- Truck type
- Major generator type
- Whether the load would normally have been processed for recyclables, and the type of recyclables, if applicable

E. COMMERCIAL PURE LOADS

OBJECTIVE

The objective for this portion of the Study was to identify waste composition and waste generation rates in the commercial sector for major waste generator types grouped by Standard Industrial Classification (SIC) codes.

While the scope of this study provided for random sampling of the total commercial waste stream, it allowed for only limited data to be collected from each of the SIC generator groups; these were referred to as "pure loads".

METHODOLOGY

To conduct the commercial waste stream sampling study, several tasks needed to be accomplished:

- o define the "pure load" categories
- o conduct the waste composition sorts
- o collect the waste generator data
- o analyze the data to produce waste composition and waste generation rates for each "pure-load" category.

COMMERCIAL WASTE GENERATOR CATEGORIES

Eight commercial waste generator categories were identified for this commercial pure-load study. A list of categories of the major commercial generators was originally obtained through conversations with the commercial waste haulers in Seattle. This list was then refined through meetings with the Seattle Solid Waste Utility staff so that the categories were consistent with other studies being conducted by the City of Seattle.

Two major commercial waste generator categories--educational institutions and medical facilities--were recognized as significant, but not included in the final pure-load category list. For the education category, it was decided that adequate waste composition information was available through previous sampling conducted in the City of Seattle and the State of Washington. The medical facility category was excluded from the sampling due to the potential hazards of handling this waste.

Table P-1, which follows this subsection, contains a listing of the eight pure-load categories, their descriptions, correlated Standard Industrial Classification (SIC) codes, and total number of loads sorted.

PURE LOAD COLLECTION METHODOLOGY

After the categories were defined, a list of the categories, their descriptions, and instructions for the collection of the pure-loads were provided to the commercial waste hauler. For each of the pure-load categories, the hauler was instructed to collect waste from three to five businesses representing that category. The hauler agreed to provide these special loads in exchange for reimbursement of truck and driver time.

SAMPLING METHODOLOGY

Sampling was conducted on July 13, 14, and 29, 1988, at the City of Seattle North Transfer Station. The process for characterizing the waste from the selected load was the same as for the other sampling tasks in this study.

WASTE GENERATOR DATA

After the sorting at each site was completed, a list of every business included in each "pure-load" was obtained from the hauler. The names of these businesses will remain confidential. Each business was contacted by letter and/or telephone and asked to respond to a questionnaire which requested the following information:

Number of employees
Seating capacity (restaurants only)
Annual sales
Number and type of containers used for waste disposal
Frequency of garbage pick-up
Description of in-house recycling programs

When the requested information was not directly provided or available from each business, other sources, such as a computer information service provided by Dun and Bradstreet, were utilized.

The commercial haulers provided the number and size of disposal containers and their frequency of collection for each firm from which waste was collected for "pure load" sampling. This information was used to estimate annual quantity of waste generated by each firm or institution.

GENERATION DATA ANALYSIS

Quantities for each SIC "pure-load" category were computed by dividing the annual waste estimate for each of the sampled businesses by the total number of the firm's full-time employees. These generation rates are given in Table P-3, immediately following this subsection.

The total annual waste produced by sampled businesses was estimated from data provided by commercial waste haulers. This data was expressed as estimated cubic yards. A conversion factor of 300 pounds per cubic yard was used to convert cubic yards to tons.

The number of employees for sampled businesses was obtained either directly from each business or through a secondary information source. The Total Number of Employees represented the number of employees that were full-time equivalents (FTE). Waste generation rates were estimated on a per employee basis.

The waste sampled from offices usually was collected from office towers. Specific information concerning the number of employees from each of the many businesses within the sampled office towers was often difficult, if not impossible, to obtain. However, square footage of rented, or leased space, within each office tower was available. To derive the number of employees per building, a facility planning estimate of 125 square feet per employee was used.

Information for the "lodging" category was based on waste generation per room.

Waste generation rates were computed as follows:

$$\text{Generation Rate} = \frac{\text{Total Annual Waste Produced by Sampled Pure Load Businesses}}{\text{Total Number of FTE Employees}}$$

$$= \text{Tons/Employee/Year}$$

F. COMMERCIAL SAMPLING FORMS

Random commercial loads were preselected in much the same way as residential loads. Exhibit V-1 shows a typical schedule sheet for commercial sampling. Truck and sample cell numbers were filled in prior to each day's sampling. Forms C-2 and C-3, shown in Exhibits V-2 and 3, respectively, were used by the gatehouse attendant and crew supervisor to record load information for each sample. Form C-2 was also used by the gatehouse to record load information for commercial pure samples. Exhibit V-4 is the form used to obtain load information from each hauler for each random commercial sample. This form (C-1) was accompanied by two pages of instructions.

The crew supervisor used a modified Form C-3 to record load information for commercial pure loads. This modified form is shown in Exhibit V-5. Each customer whose garbage was contained within a pure load was sent the letter and questionnaire shown in Exhibit V-6. This questionnaire provided the information needed to establish generation rates. An office Data Collection Sheet was used to collate this information for each commercial pure category sampled, as shown in Exhibit V-7.

TABLE P-1

PURE LOAD CATEGORIES

Category		SIC Codes	# Loads
A.	Manufacturing e.g., wood products, transportation equipment, chemical products, textiles, etc.	20-29, 30-39	3
B.	Wholesale Trade e.g., hardware, machinery electrical, apparel, etc.	50, 51	3
C.	Retail Trade e.g., department stores and drug stores	52, 53, 54, 56, 57, 59	3
D.	Restaurants Fast food only (2) Other than fast food (2)	58	4
E.	Lodging e.g., hotels, motels, etc.	70	2
F.	Office e.g., finance, insurance real estate, travel agencies printers, publishers, governmental offices, etc.	60-67, 81, 91-97 43, 48, 49	3
G.	Health Facility (Not Sampled)		
H.	Educational Institution (Not Sampled)		
I.	Transportation Field Services, e.g., both public and private transportation service and maintenance shops including bus, car, water, etc.	55, 75, 40-42 44-49	3
J.	Other Services e.g., laundries, beauty shops, electrical repair cinemas, theater, commercial sports, zoos, churches, etc. This category may include light retail if a pure-load pickup is not feasible.	72, 73, 76, 78 79, 83, 84, 86 88, 89	3

SEATTLE WASTE COMPOSITION STUDY
SAMPLING RESULTS
COMPONENT PERCENTAGES BY WEIGHT

TABLE P-2

COMMERCIAL PURE SAMPLES

	MNF	WHSL	RET	REST	HOTEL	OFFICE	TRANS	OTHER
PAPER								
Newspaper	0.69	1.41	1.67	2.23	7.52	3.86	2.34	5.08
Corrugated Paper	11.40	21.19	9.03	9.59	5.92	21.10	6.80	10.80
Computer Paper	0.00	2.07	0.27	0.00	0.00	4.29	0.18	0.47
Office Paper	0.00	0.29	0.00	0.00	0.91	5.81	1.07	0.37
Mixed Scrap Paper	13.55	6.13	18.12	3.63	10.12	17.06	5.88	17.82
Other Paper	2.24	3.36	9.55	12.09	13.59	12.24	4.53	13.33
PLASTIC								
PET Bottles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HDPE Bottles	0.00	0.00	0.00	0.32	0.52	0.00	0.04	0.26
Expanded Polystyrene	2.41	0.12	0.48	1.71	0.89	0.23	0.25	0.53
Plastic Packaging	9.87	4.64	6.13	9.71	9.89	3.71	4.03	6.18
Other Plastic Products	3.16	0.30	0.21	0.00	0.17	4.68	1.42	1.23
GLASS								
Nonrefillable Beer	0.07	0.35	1.21	0.56	4.12	0.11	0.45	2.90
Refillable Beer	0.16	1.44	0.07	0.03	9.79	0.31	0.10	1.77
Nonrefillable Pop	0.28	0.24	0.91	0.22	1.39	1.64	0.29	0.84
Refillable Pop	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Container Glass	0.75	0.66	2.95	1.11	12.62	0.38	1.01	1.66
Nonrecyclable Glass	11.33	0.00	0.17	0.28	0.00	0.00	1.00	0.00
METAL								
Aluminum Cans	0.25	0.26	0.54	0.24	3.20	0.75	0.81	1.11
Aluminum Containers	0.59	0.00	0.06	0.11	0.00	0.37	1.18	0.05
Tin Cans	0.08	0.41	0.32	3.74	0.83	0.00	0.89	1.27
Bi-metal Cans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ferrous Metals	7.28	2.84	1.30	0.77	0.29	1.35	27.41	2.16
White Goods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nonferrous Metals	0.42	1.23	0.00	0.05	1.27	0.00	0.38	0.00
Mixed Metals/Materials	1.99	0.59	1.69	0.00	0.00	0.68	4.34	1.71
RUBBER								
Rubber Products	0.96	0.00	0.11	0.00	0.00	0.00	3.15	0.73
Tires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ORGANICS								
Food	0.05	4.11	30.60	51.36	13.37	0.20	1.09	6.06
Prunings	3.62	6.49	3.86	0.14	0.00	3.37	3.45	1.19
Leaves and Grass	1.62	0.00	0.00	1.41	0.00	0.00	0.00	5.87
Wood	6.84	36.06	9.36	0.21	0.00	12.08	8.56	7.00
OTHER								
Disposable Diapers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Textiles	2.85	3.39	1.35	0.43	2.99	2.80	4.60	4.31
Leather	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ash	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ceramics, Porcelain, China	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00
Rocks, Concrete, Bricks	0.00	0.00	0.00	0.00	0.00	0.00	0.73	1.95
Soil, Dirt, Non-distinct Fines	8.82	0.66	0.00	0.00	0.58	2.80	9.28	1.50
Gypsum Drywall	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Fiberglass Insulation	7.61	0.00	0.00	0.00	0.00	0.00	0.00	0.42
Construction Debris	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HAZARDOUS								
Latex Paints	0.50	1.77	0.00	0.00	0.00	0.15	1.76	0.00
Adhesives, Glues	0.11	0.00	0.00	0.00	0.00	0.00	0.18	0.00
Oil-based Paints	0.00	0.00	0.06	0.00	0.00	0.00	0.24	0.16
Cleaners	0.19	0.00	0.00	0.00	0.00	0.00	0.41	0.05
Pesticides	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Batteries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Motor Oil, Diesel Oil	0.25	0.00	0.00	0.00	0.00	0.00	1.92	0.63
Asbestos	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Explosives	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Chemicals	0.08	0.00	0.00	0.00	0.00	0.00	0.13	0.00
NUMBER OF SAMPLES REPRESENTED:	3	3	3	4	2	3	3	3

SEATTLE WASTE COMPOSITION STUDY
COMMERCIAL PURE LOAD INFORMATION

TABLE P-3

CATEGORY	# of Accounts Sampled *1	# of Employees *2	Total Annual Tonage *6	Total Square Footages *3	Commodities Recycled *4	Annual Generation Rate (tons/emp)
Restaurant:	15	352.5	675	*5	OCC - 7 UBC - 1 GLASS - 2	1.91
Office:	10	1254	298.5	156,733	OCC - 2 PAPER - 3	0.24
Transportation:	10	121	149.25	119,203	UBC - 3 PAPER - 2 GLASS - 2 OIL - 3	1.23
Wholesale:	9	231.5	376.5	180,250	OCC - 3 UBC - 2 METAL - 1 SOLVENT - 1	1.63
Retail:	9	143.5	307.5	110,720	OCC -5 UBC - 1	2.14
Other Services:	9	58.5	124.5	*5	OCC - 2 PAPER - 1 METAL - 2	2.13
Manufacturing:	9	441.5	421.5	*5	OCC - 1 PAPER - 3 UBC - 1 METAL - 2 GLASS - 1 OIL - 1	0.95
Lodging:	6	140	262.5	381 rooms *7		1.88 tons/emp 2.72 tons/room

notes:
*1 some business refused to provide information and were left out of this count
*2 employee figures for office buildings were not available from the sources contacted.
*3 for "Lodging" category, number of rooms is given instead of square footage.
*4 each commodity is listed with the number of businesses who recycle.
*5 incomplete information provided.
*6 reported cubic yards x 300 lbs/CY conversion
*7 there are 7000 rooms within City limits

EXHIBIT V-1

1988-9 SEATTLE SOLID WASTE STREAM COMPOSITION STUDY

- Commercial Waste Sub-Stream Samples - SOUTH TRANSFER STATION

MONTH	DATE	DAY	HAULER	LOAD TYPE ROLL-OFF FRONT LOADER REAR LOADER	ROUTE	TRANSFER STATION DESTINATION	TRUCK NUMBER	CELL NUMBER
APR	22	FR	BAYSIDE	RO	2E	S		
			BAYSIDE	RO	3B	S		
			BAYSIDE	RO	4D	S		
			BAYSIDE	RO	6G	S		
			BAYSIDE	RO	7D	S		
			BAYSIDE	FL	1C	S		
			BAYSIDE	FL	3C	S		
			NW ENVIRO	RO	6	S		
			NW ENVIRO	RO	34	N/S*		
			NW ENVIRO	FL	2	S		

*Find out beforehand to which station this route truck goes. If it goes south, sample it, if it doesn't, subtract digits from the route number until a south-bound truck is sampled.

Form #C-2 (B1 & B2)

SEATTLE SOLID WASTE COMPOSITION STUDY

Commercial Loads (mixed or pure)

Transfer Station Gatehouse Weight Record

Location: _____ Sampling Date: _____ Day of Week: _____

Hauler	Truck #	Type of Load		ETA at Transfer Station	Net Weight of Load	Comments
		Mixed	Pure			

EXHIBIT V-2

Form #C-3 (B1)

SEATTLE SOLID WASTE COMPOSITION STUDY

Commercial Mixed Loads

Crew Supervisor's Daily Sampling Tally

Location: _____ Sampling Date: _____ Day of Week: _____

Hauler	Truck #	Route #	Load #	Type of Truck			ETA at Transfer Station	Take Sample from Cell #	Sample results from attached (x)
				FL	RL	R-O			

Special Conditions which may affect loads on this sampling day: _____

Form #C-1 (81)
(L1326e)

SEATTLE SOLID WASTE COMPOSITION STUDY

Commercial Mixed Loads

Commercial Hauler Route Information

Name of Hauler: _____ Sampling Date: _____ Day of Week: _____

Route #	Truck #	Truck Type			ETA at Transfer Station	Major Generator Type (100%)	Would load normally be processed for recyclables?			Where would load normally be processed?
		FL	RL	R-O			NO	YES	TYPE	

PROCEDURES FOR COMPLETING
COMMERCIAL HAULER ROUTE INFORMATION FORMS

Attached are the two "Commercial Hauler Route Information" forms for the sampling to be conducted on April 21 and 22. The following is a brief description of the coding and instructions as to how to fill in the information requested.

- ROUTE #/LOAD # - is the code which you provided to me to identify that particular load.
- TRUCK # - please provide the truck number for each route/load so that it can easily be identified at the transfer station scales.
- TRUCK TYPE - Front loader (FL), Rear loader (RL), Roll-off (RO).
- ETA at Transfer Station - we need good estimates for each route/load in order to appropriately schedule crews. The current information is that which you have provided.
- MAJOR GENERATOR TYPE - please fill in "generator type" (see description following) for the loads which are produced from only one account and/or generator type. The generator type categories are:

  1. Office e.g., finance, insurance, real estate, travel agencies, printers, publishers, governmental offices, etc.
  2. Transportation Field Services e.g., both public and private transportation service and maintenance shops including bus, car, water, etc.
  3. Restaurants If possible, designate "F" for fast food or "O" for other than fast food.
  4. Wholesale Trade e.g., hardware, machinery, electrical goods, apparel, etc.
  5. Retail Trade e.g., department stores, grocery, drug stores, etc.
  6. Other Services e.g., laundries, beauty shops, electrical repair, cinemas, theater, commercial sports, zoos, churches, etc. This category may include light retail if a pure load pickup is not feasible by hauler.
  7. Manufacturing e.g., wood products, transportation equipment, chemical products, textiles, etc.
  8. Lodging e.g., hotels, motels, etc.

From what I understand, the roll-off loads should fall into this category. Please note that I am not asking for the names of businesses, only the "type" of business.

- o WOULD LOAD NORMALLY BE PROCESSED FOR RECYCLABLES? - Please check "NO" if the load would be dumped for disposal; please check "YES" if the load would be sorted for recyclables and please note the recyclables by the following codes:

Corrugated	= OCB
Tin Cans	= UTC
Aluminum Cans	= UAC
Glass Bottles	= UGB
Computer Paper	= CP
White Paper	= WP
Mixed Paper	= MP
Newspaper	= NEWS

or other, please indicate the material

This section is very important so that our data will reflect "hind-end" recycling efforts and better estimate commercial waste being landfilled.

(1576e)

Form C-3 (B2)

SEATTLE WASTE COMPOSITION STUDY

Commercial Pure Loads

Crew Supervisor's Daily Sampling Tally

Location: _____ Sampling Date: _____ Day of Week: _____

Hauler	Truck #	Generator Type by Code	ETA at Transfer Station	Take Sample from Cell #	Sample Results Attached (x)

EXHIBIT V-5

VV-1975-CC1-AA
3101

Dear Office Manager:

Subject: City of Seattle
Waste Characterization Questionnaire

I'm sure you are aware of the garbage disposal problems here in the Northwest. In effort to better understand garbage, waste generation, and waste disposal options, the City of Seattle is currently conducting a "Waste Characterization" study. For this study, selected loads of waste are actually sorted, by hand, into over thirty-five categories.

Recently, a load of garbage was sorted which contained waste from your type of business. In order to effectively use the information collected from the sorting, we need to gather some information about you business as a "waste generator." The information that you provide will be aggregated with information from other like businesses to be used for garbage forecasting, or in other words, predicting how much waste is generated by your type of business. At this point, I would like to stress that particular information regarding your business will be held in the strictest of confidence and at no time will the name of your business be mentioned in the results of this study. This study shall be used to evaluate trends in waste generation and potential recycling activities.

I hope that you will provide the information requested on the following questionnaire. If you have any questions or concerns, please contact me at (206) 441-7500. Again, I want to emphasize that the information which you will provide will be aggregated with information from other like businesses. The name of your business will not be released. Included for your convenience is a stamped return envelope. Please complete the form by the date indicated. Thank you for your assistance and cooperation.

Very truly yours,

R. W. BECK AND ASSOCIATES

Robin L. Mortimer
Recycling Specialist

RLM/lr
(L1865e)
(L1866e-M)

QUESTIONNAIRE FOR THE
CITY OF SEATTLE
WASTE CHARACTERIZATION STUDY

Please return by _____

Name of Business:

Address:

Key Contact for more information:

1. Number of employees (full time equivalents): _____

2. Square footage of your business place: _____

3. Annual Sales: $_____

4. The number and type of containers used for waste disposal: _____

   Frequency of garbage pick-up: _____

5. Does your business currently participate in any in-house recycling activities (such as an office paper recycling program, or glass, metals, cardboard collection)?

   YES ☐ NO ☐

   If YES, please use the reverse side of this questionnaire to describe your activities, and if possible, estimate the quantities and types of materials recycled per month (or other time period).

Thank you very much for your assistance and cooperation. Please return this questionnaire in the envelope provided or mail to:

Robin Mortimer
R. W. Beck and Associates
Fourth and Blanchard Building
2121-4th Avenue, Suite 600
Seattle, Washington 98121

Please direct any questions or concerns to:

Robin Mortimer, (206) 441-7500

(L0506e)

COMMERCIAL PURE LOAD
DATA COLLECTION SHEET

CITY _____

DATE OF SORT _____

NAME ADDRESS CONTACT & PHONE	# FULL-TIME EMPLOYEES	SQ. FT. OF BUSINESS PLACE	ANNUAL SALES

EXHIBIT V-7 2 of 2

NAME	SIZE & # DUMPSTERS	SERVICE	RECYCLING		
			NO	YES	DESCRIPTION

VI. MONTHLY SAMPLING SUMMARIES

SECTION VI. MONTHLY SAMPLING SUMMARIES

A. GENERAL COMMENTS

MARCH 1988

Nine residential loads were sampled on the 29th and eight on the 30th. One of the scheduled loads for the 30th did not arrive, or was missed, on its way through the transfer station. One of the samples on the 29th was partially lost when bags of component materials, ready for weighing, were inadvertently thrown out. A total of 16 valid samples were entered into the database. These residential samples, the first of any kind for this study, averaged just over 286 pounds per sample. The month of March was characterized by slightly warmer than normal temperatures and by slightly more precipitation than normal. However, the week prior to the sampling was much cooler and wetter than normal--over 70% of the month's rain fell March 22-29 and the average daily temperatures were 2-3 degrees below normal.

There were no commercial or self-haul samplings in March.

APRIL 1988

April marked the first month in which commercial and self-haul samplings occurred, in addition to 17 residential samples taken on the 14th and 15th of the month. One of the scheduled residential samples on the 14th did not arrive, or was missed. The week prior to the sampling was warmer and drier than normal. April 10 was the warmest day of the month. A slight amount of rain did fall early on the morning of April 13.

Twenty random commercial routes were sampled, 10 each day, on the 21st and 22nd. These loads included both Bayside and Seattle Disposal routes.

Eighteen self-haul loads were sampled throughout the day of the 19th at the North Transfer Station. One of these samples, an automobile, was from outside the City limits. Of the 10 residential self-haul samples, seven haulers indicated they participated in recycling programs; five of those used the City's curbside program. Only two vehicles brought materials they intended to recycle at the transfer station--one for oil, the other batteries. The reason most frequently given for recycling was that it protects the environment from pollution. Prior to the self-haul and commercial samplings, it had been warmer than normal, with near normal precipitation. It was cloudy and cool with light rain on the night of April 21 and the morning of April 22.

MAY 1988

Residential sampling took place on the 12th and 13th at the South and North Transfer Stations, respectively. There were eight loads sampled each day; one load was missed on the 13th. The week prior to sampling had been warmer than normal, with average precipitation, mostly all occurring on the sampling days.

Two scheduled commercial samples were missed on the 20th, giving a total of 18 loads for the 19th and 20th. Temperatures averaged about normal, and heavier than normal rain occurred on May 16. Eighteen self-haul samples were taken at the South Transfer Station on the 9th. One selected automobile refused to take part in the study because it was felt to be an invasion of privacy; the next automobile to arrive was chosen instead. Of the eight residential loads, five participants said they recycled; three of those used the City's curbside program. Only one vehicle brought recyclables--newspaper. The week prior began slightly cooler than normal; precipitation was average, occurring early in the week.

JUNE 1988

Eight residential samples were sorted each day on the 28th and 29th. Temperatures prior to sampling were normal, but precipitation remained scarce with only a trace on June 28.

Eleven random commercial loads were sorted on the 7th. The week prior to sampling was cooler and wetter than normal--some rain fell every day for seven days prior.

Greater productivity than anticipated resulted in 23 self-haul samples at the North Transfer Station on Saturday the 25. An unknown number of "Clean Green" vehicles that were potential samples were missed, when it was discovered late in the day that the gatehouse was not counting these vehicles. All self-haul vehicles are to be counted when selecting samples.

The previous week's weather was mild and slightly warmer and drier than normal.

All of the self-haul samples this day were residential loads. Only two drivers indicated they did not recycle. Of the 21 who did, 19 were on the City's curbside program. Three vehicles brought recyclables, containing glass, metals, and cardboard.

JULY 1988

A total of 18 residential samples occurred on the 8th and 11th at the North and South Transfer Stations, respectively. Early July had cooler than normal temperatures and seasonal precipitation. Rain fell on July 1 and 2. Temperatures returned to normal by the 11th, with just a trace of rain since July 2 on July 10 and 11.

The first random commercial night sort took place on the 11th. Ten samples, arriving at the South Transfer Station between 8:30 pm and 1:30 am, were sorted.

Twenty-four specially selected commercial pure loads were sorted over the course of three days, the 13th, 14th and 29th. These samples were routed to the North Transfer Station for the haulers convenience, and to relieve the South Transfer Station from accommodating these commercial samples. (All normal random commercial sorting was done at the South Transfer Station.) The week prior to the 13th was characterized by seasonal temperatures and precipitation with rain falling on July 12. By the end of the month it was hot and dry, with no rain since July 12. Temperatures were in the low 90s again July 25 and 26.

The week prior to self-haul sampling was warmer and drier than normal. It was very hot July 19 and 20 with an all-time high registered for July 20 (95°). An unusually slow day of traffic at the South Transfer Station, due likely to the hot weather, resulted in only 13 self-haul samples being taken on the 21st. Two other potential samples were missed inside the Transfer Station. Another selected load was not sorted due to a high concentration of maggots. Of the seven residential loads, four participants currently recycled, three of these with the City's curbside program. One vehicle was bringing recyclables to drop off glass and newspaper.

AUGUST 1988

Due to two no-shows, only seven residential samples were taken on August 10 at the North Transfer Station. All of the nine scheduled samples on the 11th were obtained at the South Station. Temperatures had been slightly higher than normal just prior to sampling.

A single day of random commercial sampling happened on the 24th. Ten loads were scheduled, but one driver dumped his truck in the parking lot of the South Transfer Station by mistake. This load was not sorted. On the day before sampling, a record 91° was reached, even though the previous week had been fairly normal. By this time in the month, drier than expected weather had been anticipated.

Self-haul sampling was done at the North Transfer Station this month, and 20 samples were taken. Fifteen samples were residential; ten of the eleven which recycled used the City's curbside program. Six vehicles brought recyclables to drop off. These recyclables included "clean green" yard and garden wastes, batteries, metal, and cardboard. High temperatures preceded this sampling on the 5th of the month, with 90° recorded on the 3rd. The sampling date marked the beginning of a cool, somewhat cloudy period, with temperatures dropping below normal.

SEPTEMBER 1988

One of the nine scheduled residential loads on the 1st was missed at the South Transfer Station. All 10 (9 regular and schedule make-up) North samples were sorted on the 2nd. Early in the week prior to sampling, temperatures were higher than usual, returning to normal just before sampling. However, on the 1st of the month, temperatures jumped significantly above normal. On both the 2nd and 3rd of September, records were set at 98° and 92°, respectively.

No commercial loads were scheduled or sorted this month.

By the time self-haul sampling occurred at the South Transfer Station on the 9th, temperatures had dropped to slightly below normal, with a trace of rainfall. A total of 16 samples were taken, two of which were from outside the City limits. One additional load was selected but not sorted, due to excessive maggots and putrification. Eleven of the samples were residential, and all drivers claimed participation in some form of recycling. All but four of these were on the City's curbside program. These four took recyclables to neighborhood collection sites. None of the sampled vehicles brought recyclables to drop at the transfer station.

OCTOBER 1988

Two out of ten scheduled residential loads were missed on October 19 at the North Transfer Station. One of the remaining eight samples was a scheduled make-up. Ten samples were taken on the 20th at the South Transfer Station, two of which were make-ups. One of these make-ups replaced a load (Route 71) originally scheduled for Thursday, but this sampling did not actually occur. Both sampling days saw temperatures above normal, with heavy fog, following a week of wet, foggy weather. The sample loads were mostly wet.

One day of random commercial sampling took place on Halloween, Monday the 31st. Ten loads were sampled at the South Transfer Station. Temperatures warmed steadily during the week prior to sampling with a slight amount of rain appearing on the 30th. The high temperature on the 31st was 66°, approximately 10 degrees above normal.

A total of 22 self-haul samples were taken at the North Transfer Station on the 26th. The week prior to sampling had seen normal temperatures, with only a trace of precipitation. Of the 17 residential loads, only 2 drivers brought material with the intent to recycle--one metals, one clean green. All but four residential haulers participated in recycling; nearly all used the City's curbside program. Conservation of resources and environmental protection ranked equally as the preferred reasons for recycling.

NOVEMBER 1988

One make-up load was added to the November 8 residential schedule, providing a total of 10 samples for this day at the South Transfer Station. Three of the ten loads set for the 9th did not arrive. One of these no-shows was a make-up load. The seven samples sorted were all originally scheduled. Early in the week preceding sampling, temperatures had been slightly higher than normal, with rain every day. By sampling day, temperatures returned to the normal average of 46°, with continuing light rain.

No commercial sampling was scheduled or sorted this month.

Self-haul sampling at the South Transfer Station occurred on November 1, following a week of higher than average temperatures and little rain. Of the 14 samples taken, 12 were of residential origin. The four participants not currently recycling expressed a wide variety of reasons for not doing so. Just over half of the seven recycling patrons used the City's curbside program. The remaining three either recycled at neighborhood centers or at the Transfer Station. Four of the residential samples were from outside the City limits.

DECEMBER 1988

One of the scheduled December 9 residential loads was missed, but a make-up load offset this loss for a total of nine samples this day at the North Station. The same situation occurred at the South Station on the 12th. Warmer than average temperatures and a trace of precipitation preceded these samplings. The highest temperature of the month, 56°, was recorded on Monday the 12th.

The second random commercial night sort took place on Wednesday the 14th at the South Transfer Station. Eleven loads arrived between 8:30 and 11:30 pm, and were subsequently sorted throughout the night.

Of the twenty self-haul samples taken on December 1 at the North Transfer Station, 16 were from residential vehicles. Twelve of these residential patrons currently recycled, all through the City's program. Lack of convenience and recyclable materials were noted as reasons by those not recycling. Three vehicles brought recyclables to be dropped off. All three had metals; one also had glass, the other had yard waste. This day of sampling followed a week of cool, normal temperatures.

JANUARY 1989

January marked the beginning of two new service contracts for residential collection. For the most part, previously selected sample routes were no longer valid. New samples had to be chosen, based on the new routes which were in transition throughout the month. Wherever possible, new routes coinciding with the original sample list were selected for the

new set of samples. In order to maximize this match-up, new sampling days were also chosen.

Ten samples were sorted at the South Station on the 12th. All of these routes essentially matched the nine originally scheduled, plus one make-up. Sampling at the North Station on the 23rd was a different story. The 11 loads sampled this day represented six routes, five of which were sampled from two separate loads. Most of the new northern routes *approximated* the old ones, and as close a match as possible was made. Prior to sampling on the 12th, temperatures were slightly above normal, with highs into the mid-forties. Slight amounts of rain were also recorded for that week. By the time the 23rd's sorting occurred, temperatures had cooled to normal, with slight rain and traces of snow.

No commercial sampling was scheduled or sorted this month.

Self-haul samples at the South Station on the 2nd were almost evenly split between residential and commercial generators. Ten of eighteen samples were residential. All but two haulers currently recycled, with five of the eight using the City's curbside program. Two residential loads were from outside the City limits. Only one vehicle brought recyclables with the intent of recycling--an entire load was metal. The weather had been warm, in the 50's, and wet, prior to sampling.

FEBRUARY 1989

Residential sampling concluded this month, completing 12 months of data and 212 samples. Route transition problems were still evident. Fortunately, South Transfer Station sampling on the 9th matched those routes originally scheduled. Eleven samples were taken. Northern sampling matched only two original routes, however. A chaotic day of sampling on the 16th resulted in eight loads sampled. Three loads were missed entirely. Unusually cold temperatures preceded sampling on the 9th, with haulers still trying to recover from missed pick-ups due to heavy snow on the 1st and 2nd of the month. Temperatures warmed to just below normal by the 16th, with haulers still trying to catch up.

The final day of random commercial sampling occurred on the 22nd, resulting in a total of 97 samples. Eight loads were sampled, two were missed. Temperatures were normal, with slight rain during the week prior to sampling.

Seventeen self-haul samples were taken at the North Transfer Station on the 15th. Fourteen of these were residential, all from within City limits. Two patrons did not currently recycle, one had just signed up for curbside, the other intended to, and was given the phone number to sign up. Three residential vehicles brought recyclables--one glass, one cardboard, and one yard waste. Weather prior to this date had been colder than normal, with only a trace of precipitation three days before sampling.

MARCH 1989

No residential or commercial samplings were scheduled in March. Sampling for both substreams concluded in February.

Self-haul samples occurred on the 5th at the South Transfer Station, following a week of unusually cold and snowy weather. Of the 17 samples taken, only two were of commercial origin. All but three of the residential patrons currently recycled, nearly all through the City's curbside program. This day of sampling concluded the self-haul substream, with a total of 217 samples taken.

B. SAMPLING SCHEDULES

Table VI-1 gives a variety of information for all samples taken to date.

SEATTLE WASTE COMPOSITION STUDY
SAMPLE LISTING - 550 SAMPLES
MARCH, 1988 THROUGH MARCH, 1989

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
R	60	PM	3/29/88	1	X	S	X
R	66	PM	3/29/88	1	X	S	X
R	80	PM	3/29/88	1	X	S	X
R	54	PM	3/29/88	1	X	S	X
R	70	AM	3/29/88	1	X	S	X
R	69	PM	3/29/88	1	X	S	X
R	52	PM	3/29/88	1	X	S	X
R	56	PM	3/29/88	2	X	S	X
R	22	AM	3/30/88	1	X	N	X
R	18	AM	3/30/88	1	X	N	X
R	1	AM	3/30/88	1	X	N	X
R	26	PM	3/30/88	1	X	N	X
R	11	AM	3/30/88	1	X	N	X
R	20	PM	3/30/88	1	X	N	X
R	29	PM	3/30/88	2	X	N	X
R	30	PM	3/30/88	2	X	N	X
R	5	AM	4/14/88	1	X	N	X
R	16	PM	4/14/88	1	X	N	X
R	17	PM	4/14/88	1	X	N	X
R	17	AM	4/14/88	1	X	N	X
R	23	PM	4/14/88	1	X	N	X
R	6	PM	4/14/88	1	X	N	X
R	20	PM	4/14/88	1	X	N	X
R	29	AM	4/14/88	2	X	N	X
R	98	PM	4/14/88	2	X	S	X
R	64	PM	4/15/88	1	X	S	X
R	75	PM	4/15/88	1	X	S	X
R	61	PM	4/15/88	1	X	S	X
R	65	PM	4/15/88	1	X	S	X
R	72	PM	4/15/88	1	X	S	X
R	50	PM	4/15/88	1	X	S	X
R	53	PM	4/15/88	1	X	S	X
R	56	PM	4/15/88	2	X	S	X
S	KET	13	4/19/88	1	X	N	A
S	432	12	4/19/88	1	X	N	A
S	132	15	4/19/88	1	X	N	A
S	GSB	14	4/19/88	1	X	N	A
S	LLG	9	4/19/88	1	X	N	A
S	LF4	15	4/19/88	1	X	N	P
S	255	14	4/19/88	1	X	N	P
S	TB9	10	4/19/88	1	X	N	A
S	KQS	11	4/19/88	1	X	N	A
S	XL4	12	4/19/88	1	X	N	T
S	TS7	11	4/19/88	1	X	N	A
S	LHF	16	4/19/88	1	X	N	A
S	VH6	10	4/19/88	X	J	N	T
S	GH9	14	4/19/88	X	J	N	P
S	TJ2	16	4/19/88	X	J	N	A
S	PE4	13	4/19/88	X	J	N	T
S	XE1	15	4/19/88	X	J	N	T
S	T20	9	4/19/88	X	J	N	T

TABLE VI-1 2 of 11

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
C	O21	RO	4/21/88	X	J	E	X
C	O29	RO	4/21/88	X	I	E	X
C	O7F	RO	4/21/88	X	B	B	X
C	O2F	RO	4/21/88	X	B	B	X
C	O6F	RO	4/21/88	X	A	B	X
C	O7G	RO	4/21/88	X	B	B	X
C	O1F	RO	4/21/88	X	A	B	X
C	O5F	RO	4/21/88	X	E	B	X
C	OS4	FL	4/21/88	X	K	E	X
C	OS3	FL	4/21/88	X	K	E	X
C	O6G	RO	4/22/88	X	A	B	X
C	O4D	RO	4/22/88	X	B	B	X
C	O7D	RO	4/22/88	X	A	B	X
C	O3B	RO	4/22/88	X	B	B	X
C	OS6	RO	4/22/88	X	A	E	X
C	O3D	FL	4/22/88	X	K	B	X
C	S34	RO	4/22/88	X	E	E	X
C	02E	RO	4/22/88	X	C	B	X
C	O1C	FL	4/22/88	X	K	B	X
C	OS2	FL	4/22/88	X	K	E	X
S	IVR	13	5/09/88	1	X	S	A
S	EKR	11	5/09/88	1	X	S	A
S	XH1	11	5/09/88	1	X	S	P
S	L22	14	5/09/88	1	X	S	P
S	HYY	10	5/09/88	1	X	S	A
S	63	12	5/09/88	1	X	S	A
S	944	15	5/09/88	1	X	S	P
S	TH9	13	5/09/88	1	X	S	P
S	LE2	11	5/09/88	1	X	S	P
S	UL4	9	5/09/88	1	X	S	P
S	EUL	9	5/09/88	1	X	S	A
S	HS8	14	5/09/88	1	X	S	P
S	A10	15	5/09/88	1	X	S	P
S	GA3	16	5/09/88	1	X	S	P
S	L82	15	5/09/88	1	X	S	P
S	610	13	5/09/88	X	I	S	P
S	110	10	5/09/88	X	I	S	P
S	A89	10	5/09/88	X	A	S	P
R	57	PM	5/12/88	1	X	S	X
R	59	AM	5/12/88	1	X	S	X
R	74	AM	5/12/88	1	X	S	X
R	65	AM	5/12/88	1	X	S	X
R	52	PM	5/12/88	1	X	S	X
R	54	AM	5/12/88	1	X	S	X
R	98	PM	5/12/88	2	X	S	X
R	56	AM	5/12/88	2	X	S	X
R	18	PM	5/13/88	1	X	N	X
R	2	PM	5/13/88	1	X	N	X
R	24	PM	5/13/88	1	X	N	X
R	23	AM	5/13/88	1	X	N	X
R	8	AM	5/13/88	1	X	N	X
R	5	PM	5/13/88	1	X	N	X
R	9	AM	5/13/88	1	X	N	X
R	26	AM	5/13/88	2	X	N	X

TABLE VI-1 3 of 11

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
C	06G	RO	5/19/88	X	A	B	X
C	0S4	RO	5/19/88	X	E	E	X
C	03G	RO	5/19/88	X	A	B	X
C	0S7	RO	5/19/88	X	A	E	X
C	02C	RO	5/19/88	X	I	B	X
C	S32	RO	5/19/88	X	I	E	X
C	S30	RO	5/19/88	X	B	E	X
C	06D	RO	5/19/88	X	A	B	X
C	03C	RO	5/19/88	X	A	B	X
C	S34	RO	5/19/88	X	C	E	X
C	S35	RO	5/20/88	X	J	E	X
C	02G	RO	5/20/88	X	A	B	X
C	04B	RO	5/20/88	X	I	B	X
C	07F	RO	5/20/88	X	B	B	X
C	02D	FL	5/20/88	X	K	B	X
C	03D	FL	5/20/88	X	K	B	X
C	01D	FL	5/20/88	X	K	B	X
C	02B	FL	5/20/88	X	K	B	X
C	04G	RO	6/07/88	X	B	B	X
C	04C	RO	6/07/88	X	A	B	X
C	01A	RO	6/07/88	X	J	B	X
C	06A	RO	6/07/88	X	A	B	X
C	216	RO	6/07/88	X	I	E	X
C	07A	RO	6/07/88	X	B	B	X
C	07G	RO	6/07/88	X	J	B	X
C	2	FL	6/07/88	X	K	E	X
C	217	RO	6/07/88	X	J	E	X
C	3	FL	6/07/88	X	K	E	X
C	02B	FL	6/07/88	X	K	B	X
S	WDE	16	6/25/88	1	X	N	A
S	UX1	9	6/25/88	1	X	N	P
S	HZM	11	6/25/88	1	X	N	A
S	NAU	14	6/25/88	1	X	N	A
S	LXZ	15	6/25/88	1	X	N	A
S	ERJ	12	6/25/88	1	X	N	A
S	582	16	6/25/88	1	X	N	P
S	598	13	6/25/88	1	X	N	P
S	EYD	11	6/25/88	1	X	N	A
S	UZ8	12	6/25/88	1	X	N	P
S	IPV	9	6/25/88	1	X	N	A
S	989	16	6/25/88	1	X	N	P
S	LXX	12	6/25/88	1	X	N	A
S	HV9	12	6/25/88	1	X	N	P
S	866	14	6/25/88	1	X	N	P
S	PE4	11	6/25/88	1	X	N	P
S	846	11	6/25/88	1	X	N	P
S	TS5	15	6/25/88	1	X	N	T
S	596	12	6/25/88	1	X	N	P
S	LM4	14	6/25/88	1	X	N	P
S	QD1	15	6/25/88	1	X	N	T
S	HYW	10	6/25/88	2	X	N	A
S	BZP	13	6/25/88	2	X	N	A

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
R	17	AM	6/28/88	1	X	N	X
R	12	PM	6/28/88	1	X	N	X
R	8	AM	6/28/88	1	X	N	X
R	23	PM	6/28/88	1	X	N	X
R	5	AM	6/28/88	1	X	N	X
R	2	AM	6/28/88	1	X	N	X
R	1	PM	6/28/88	1	X	N	X
R	6	PM	6/28/88	1	X	N	X
R	29	PM	6/28/88	2	X	N	X
R	57	PM	6/29/88	1	X	S	X
R	73	PM	6/29/88	1	X	S	X
R	61	PM	6/29/88	1	X	S	X
R	76	PM	6/29/88	1	X	S	X
R	58	PM	6/29/88	1	X	S	X
R	59	AM	6/29/88	1	X	S	X
R	68	AM	6/29/88	1	X	S	X
R	73	AM	6/29/88	1	X	S	X
R	93	PM	6/29/88	2	X	S	X
R	50	AM	7/08/88	1	X	S	X
R	69	AM	7/08/88	1	X	S	X
R	76	AM	7/08/88	1	X	S	X
R	73	AM	7/08/88	1	X	S	X
R	65	AM	7/08/88	1	X	S	X
R	71	AM	7/08/88	1	X	S	X
R	68	AM	7/08/88	1	X	S	X
R	72	AM	7/08/88	1	X	S	X
R	75	AM	7/08/88	1	X	S	X
R	56	AM	7/08/88	2	X	S	X
C	08B	RO	7/11/88	X	J	B	X
C	08A	RO	7/11/88	X	A	B	X
C	10A	RO	7/11/88	X	A	B	X
C	10E	RO	7/11/88	X	J	B	X
C	10C	RO	7/11/88	X	B	B	X
C	21	RO	7/11/88	X	K	E	X
C	33	RO	7/11/88	X	F	E	X
C	09E	RO	7/11/88	X	B	B	X
C	04E	FL	7/11/88	X	K	B	X
C	04D	FL	7/11/88	X	K	B	X
R	2	PM	7/11/88	1	X	N	X
R	19	PM	7/11/88	1	X	N	X
R	23	PM	7/11/88	1	X	N	X
R	5	AM	7/11/88	1	X	N	X
R	1	AM	7/11/88	1	X	N	X
R	9	PM	7/11/88	1	X	N	X
R	28	PM	7/11/88	2	X	N	X
R	30	PM	7/11/88	2	X	N	X
P	7	0	7/13/88	X	J	N	X
P	4	FF	7/13/88	X	D	N	X
P	2	0	7/13/88	X	C	N	X
P	1	0	7/13/88	X	F	N	X
P	3	0	7/13/88	X	B	N	X
P	4	0	7/13/88	X	D	N	X
P	6	0	7/13/88	X	I	N	X
P	5	0	7/13/88	X	A	N	X

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
P	1	0	7/14/88	X	J	N	X
P	2	0	7/14/88	X	F	N	X
P	6	0	7/14/88	X	C	N	X
P	3	0	7/14/88	X	I	N	X
P	7	0	7/14/88	X	D	N	X
P	4	0	7/14/88	X	B	N	X
P	5	0	7/14/88	X	A	N	X
S	WEM	10	7/21/88	1	X	S	A
S	UT1	11	7/21/88	1	X	S	P
S	H90	13	7/21/88	1	X	S	P
S	WYK	11	7/21/88	1	X	S	P
S	WPF	13	7/21/88	1	X	S	P
S	P50	10	7/21/88	1	X	S	P
S	LHF	15	7/21/88	1	X	S	A
S	OKF	12	7/21/88	1	X	S	A
S	BTL	15	7/21/88	X	J	S	P
S	TR9	13	7/21/88	X	J	S	P
S	PR8	12	7/21/88	X	J	S	T
S	LJ8	15	7/21/88	X	D	S	T
S	L07	9	7/21/88	X	J	S	P
P	4	0	7/29/88	X	F	N	X
P	1	0	7/29/88	X	I	N	X
P	8	0	7/29/88	X	C	N	X
P	2	0	7/29/88	X	A	N	X
P	7	0	7/29/88	X	J	N	X
P	5	1	7/29/88	X	E	N	X
P	5	2	7/29/88	X	E	N	X
P	6	0	7/29/88	X	B	N	X
P	3	FF	7/29/88	X	D	N	X
S	KH8	10	8/05/88	1	X	N	A
S	LE1	16	8/05/88	1	X	N	P
S	TCV	13	8/05/88	1	X	N	A
S	WDT	16	8/05/88	1	X	N	A
S	H81	13	8/05/88	1	X	N	P
S	LKW	11	8/05/88	1	X	N	A
S	GV8	12	8/05/88	1	X	N	P
S	IHB	12	8/05/88	1	X	N	A
S	XC2	14	8/05/88	1	X	N	P
S	LSV	12	8/05/88	1	X	N	A
S	UG6	11	8/05/88	1	X	N	P
S	UC9	16	8/05/88	1	X	N	P
S	TM3	15	8/05/88	1	X	N	T
S	169	11	8/05/88	1	X	N	P
S	386	14	8/05/88	2	X	N	A
S	957	15	8/05/88	X	F	N	P
S	UB7	14	8/05/88	X	F	N	P
S	762	10	8/05/88	X	J	N	P
S	PR7	12	8/05/88	X	J	N	P
S	HZ2	10	8/05/88	X	J	N	P
R	16	PM	8/10/88	1	X	N	X
R	4	AM	8/10/88	1	X	N	X
R	16	AM	8/10/88	1	X	N	X
R	18	PM	8/10/88	1	X	N	X
R	9	PM	8/10/88	1	X	N	X
R	14	AM	8/10/88	1	X	N	X
R	28	AM	8/10/88	2	X	N	X

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
R	50	AM	8/11/88	1	X	S	X
R	61	AM	8/11/88	1	X	S	X
R	53	AM	8/11/88	1	X	S	X
R	69	AM	8/11/88	1	X	S	X
R	80	AM	8/11/88	1	X	S	X
R	62	AM	8/11/88	1	X	S	X
R	70	PM	8/11/88	1	X	S	X
R	63	PM	8/11/88	1	X	S	X
R	90	AM	8/11/88	2	X	S	X
C	2	FL	8/24/88	X	K	E	X
C	3	RO	8/24/88	X	K	E	X
C	07B	RO	8/24/88	X	A	B	X
C	07E	RO	8/24/88	X	B	B	X
C	01D	RO	8/24/88	X	A	B	X
C	01E	RO	8/24/88	X	B	B	X
C	04A	RO	8/24/88	X	B	B	X
C	02A	RL	8/24/88	X	K	B	X
C	2	RO	8/24/88	X	F	E	X
R	74	AM	9/01/88	1	X	S	X
R	68	PM	9/01/88	1	X	S	X
R	60	PM	9/01/88	1	X	S	X
R	58	AM	9/01/88	1	X	S	X
R	63	AM	9/01/88	1	X	S	X
R	76	AM	9/01/88	1	X	S	X
R	70	AM	9/01/88	1	X	S	X
R	54	PM	9/01/88	1	X	S	X
R	24	AM	9/02/88	1	X	N	X
R	3	AM	9/02/88	1	X	N	X
R	10	AM	9/02/88	1	X	N	X
R	18	AM	9/02/88	1	X	N	X
R	21	AM	9/02/88	1	X	N	X
R	9	PM	9/02/88	1	X	N	X
R	7	AM	9/02/88	1	X	N	X
R	10	PM	9/02/88	1	X	N	X
R	26	PM	9/02/88	1	X	N	X
R	28	PM	9/02/88	2	X	N	X
S	LJ8	15	9/09/88	1	X	S	P
S	INL	11	9/09/88	1	X	S	P
S	L59	13	9/09/88	1	X	S	P
S	741	9	9/09/88	1	X	S	P
S	IHH	13	9/09/88	1	X	S	A
S	XK9	15	9/09/88	1	X	S	P
S	LIP	11	9/09/88	1	X	S	A
S	TF2	11	9/09/88	1	X	S	P
S	TZ5	10	9/09/88	1	X	S	P
S	XB9	10	9/09/88	1	X	S	P
S	739	14	9/09/88	1	X	S	A
S	LA1	9	9/09/88	X	J	S	T
S	LX6	16	9/09/88	X	A	S	P
S	GG2	14	9/09/88	X	A	S	P
S	LE7	14	9/09/88	X	B	S	P
S	D26	11	9/09/88	X	J	S	T

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
R	002	AM	10/19/88	1	X	N	X
R	005	PM	10/19/88	1	X	N	X
R	007	AM	10/19/88	1	X	N	X
R	009	AM	10/19/88	1	X	N	X
R	011	PM	10/19/88	1	X	N	X
R	013	PM	10/19/88	1	X	N	X
R	023	AM	10/19/88	1	X	N	X
R	025	AM	10/19/88	1	X	N	X
R	050	PM	10/20/88	1	X	S	X
R	056	PM	10/20/88	1	X	S	X
R	057	AM	10/20/88	1	X	S	X
R	060	AM	10/20/88	1	X	S	X
R	064	PM	10/20/88	1	X	S	X
R	069	AM	10/20/88	1	X	S	X
R	073	PM	10/20/88	1	X	S	X
R	080	PM	10/20/88	1	X	S	X
R	093	PM	10/20/88	2	X	S	X
R	099	PM	10/20/88	2	X	S	X
S	123	11	10/26/88	1	X	N	A
S	UT6	14	10/26/88	1	X	N	A
S	747	14	10/26/88	1	X	N	A
S	A52	12	10/26/88	1	X	N	P
S	EYW	10	10/26/88	1	X	N	A
S	H28	15	10/26/88	1	X	N	P
S	H71	15	10/26/88	1	X	N	P
S	H86	11	10/26/88	1	X	N	P
S	HPB	10	10/26/88	1	X	N	A
S	OYT	11	10/26/88	1	X	N	P
S	H97	13	10/26/88	1	X	N	P
S	HBS	09	10/26/88	1	X	N	P
S	KKC	09	10/26/88	1	X	N	P
S	KSG	15	10/26/88	1	X	N	A
S	WIA	12	10/26/88	1	X	N	A
S	H95	15	10/26/88	2	X	N	P
S	LMS	15	10/26/88	2	X	N	A
S	LL5	11	10/26/88	X	J	N	P
S	UL1	12	10/26/88	X	J	N	T
S	UT5	13	10/26/88	X	J	N	T
S	732	11	10/26/88	X	J	N	P
S	H93	13	10/26/88	X	I	N	T
S	XL1	12	10/26/88	X	J	N	P
C	004	FL	10/31/88	X	K	E	X
C	014	RO	10/31/88	X	J	E	X
C	018	RO	10/31/88	X	I	E	X
C	01F	RO	10/31/88	X	C	B	X
C	023	RO	10/31/88	X	A	E	X
C	025	RO	10/31/88	X	E	E	X
C	02G	RO	10/31/88	X	J	B	X
C	04C	RO	10/31/88	X	B	B	X
C	06A	RO	10/31/88	X	B	B	X
C	07B	RO	10/31/88	X	D	B	X

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
S	181	13	11/1/88	1	X	S	A
S	IXU	10	11/1/88	1	X	S	A
S	627	11	11/1/88	1	X	S	A
S	659	13	11/1/88	1	X	S	P
S	788	10	11/1/88	1	X	S	P
S	910	11	11/1/88	1	X	S	P
S	921	14	11/1/88	1	X	S	P
S	A71	12	11/1/88	1	X	S	P
S	CPV	12	11/1/88	1	X	S	A
S	HZ7	14	11/1/88	1	X	S	P
S	TY4	11	11/1/88	1	X	S	P
S	UG9	10	11/1/88	1	X	S	P
S	LL7	13	11/1/88	X	J	S	P
S	360	11	11/1/88	X	J	S	A
R	050	PM	11/8/88	1	X	S	X
R	054	AM	11/8/88	1	X	S	X
R	057	AM	11/8/88	1	X	S	X
R	063	AM	11/8/88	1	X	S	X
R	067	PM	11/8/88	1	X	S	X
R	072	AM	11/8/88	1	X	S	X
R	075	PM	11/8/88	1	X	S	X
R	080	AM	11/8/88	1	X	S	X
R	081	AM	11/8/88	1	X	S	X
R	099	PM	11/8/88	2	X	S	X
R	003	PM	11/9/88	1	X	N	X
R	004	PM	11/9/88	1	X	N	X
R	010	AM	11/9/88	1	X	N	X
R	015	AM	11/9/88	1	X	N	X
R	021	PM	11/9/88	1	X	N	X
R	092	AM	11/9/88	2	X	S	X
R	092	PM	11/9/88	2	X	S	X
S	200	14	12/1/88	1	X	N	P
S	255	12	12/1/88	1	X	N	P
S	603	14	12/1/88	1	X	N	A
S	UB7	12	12/1/88	1	X	N	P
S	LSF	12	12/1/88	1	X	N	A
S	PDW	13	12/1/88	1	X	N	P
S	IVN	12	12/1/88	1	X	N	A
S	IZG	10	12/1/88	1	X	N	A
S	L02	11	12/1/88	1	X	N	P
S	LLX	09	12/1/88	1	X	N	A
S	WNR	13	12/1/88	1	X	N	A
S	WSX	13	12/1/88	1	X	N	A
S	PX5	12	12/1/88	1	X	N	P
S	WDT	15	12/1/88	1	X	N	A
S	UG6	13	12/1/88	1	X	N	P
S	US6	15	12/1/88	1	X	N	P
S	T35	09	12/1/88	X	J	N	P
S	683	10	12/1/88	X	J	N	P
S	HZ3	13	12/1/88	X	J	N	P
S	507	11	12/1/88	X	A	N	P

TABLE VI-1 9 of 11

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
R	004	AM	12/9/88	1	X	N	X
R	006	PM	12/9/88	1	X	N	X
R	012	AM	12/9/88	1	X	N	X
R	014	AM	12/9/88	1	X	N	X
R	016	PM	12/9/88	1	X	N	X
R	019	PM	12/9/88	1	X	N	X
R	023	PM	12/9/88	1	X	N	X
R	025	PM	12/9/88	1	X	N	X
R	055	AM	12/9/88	2	X	N	X
R	065	PM	12/12/88	1	X	S	X
R	068	PM	12/12/88	1	X	S	X
R	073	AM	12/12/88	1	X	S	X
R	074	PM	12/12/88	1	X	S	X
R	075	PM	12/12/88	1	X	S	X
R	080	AM	12/12/88	1	X	S	X
R	090	PM	12/12/88	2	X	S	X
R	097	PM	12/12/88	2	X	S	X
R	099	AM	12/12/88	2	X	S	X
C	027	RO	12/14/88	X	I	E	X
C	036	RO	12/14/88	X	I	E	X
C	045	RO	12/14/88	X	A	E	X
C	04A	FL	12/14/88	X	K	B	X
C	04B	RL	12/14/88	X	K	B	X
C	04C	FL	12/14/88	X	K	B	X
C	08E	RO	12/14/88	X	A	B	X
C	09D	RO	12/14/88	X	D	B	X
C	09F	RO	12/14/88	X	A	B	X
C	10C	RO	12/14/88	X	J	B	X
C	10G	RO	12/14/88	X	C	B	X
R	010	AM	1/12/89	1	X	S	X
R	010	PM	1/12/89	1	X	S	X
R	012	AM	1/12/89	1	X	S	X
R	013	AM	1/12/89	1	X	S	X
R	013	PM	1/12/89	1	X	S	X
R	014	AM	1/12/89	1	X	S	X
R	017	AM	1/12/89	1	X	S	X
R	018	PM	1/12/89	1	X	S	X
R	019	AM	1/12/89	1	X	S	X
R	056	PM	1/12/89	2	X	S	X
S	609	10	1/20/89	1	X	S	P
S	134	09	1/20/89	1	X	S	A
S	333	12	1/20/89	1	X	S	P
S	GJ9	08	1/20/89	1	X	S	P
S	HUJ	11	1/20/89	1	X	S	A
S	651	12	1/20/89	1	X	S	A
S	680	10	1/20/89	1	X	S	A
S	LT4	11	1/20/89	1	X	S	P
S	HD4	12	1/20/89	1	X	S	P
S	UK9	11	1/20/89	1	X	S	P
S	T65	09	1/20/89	X	J	S	P
S	043	10	1/20/89	X	C	S	T
S	ABC	09	1/20/89	X	J	S	T
S	HM9	08	1/20/89	X	J	S	P
S	ABC	08	1/20/89	X	J	S	T
S	LJ5	10	1/20/89	X	C	S	T
S	574	09	1/20/89	X	J	S	T
S	PR6	10	1/20/89	X	J	S	P

TABLE VI-1 10 of 11

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
R	008	AM	1/23/89	1	X	N	X
R	008	PM	1/23/89	1	X	N	X
R	014	AM	1/23/89	1	X	N	X
R	014	PM	1/23/89	1	X	N	X
R	023	AM	1/23/89	1	X	N	X
R	023	PM	1/23/89	1	X	N	X
R	036	AM	1/23/89	1	X	N	X
R	036	PM	1/23/89	1	X	N	X
R	111	AM	1/23/89	1	X	N	X
R	111	PM	1/23/89	1	X	N	X
R	112	PM	1/23/89	1	X	N	X
R	010	PM	2/9/89	1	X	S	X
R	011	PM	2/9/89	1	X	S	X
R	013	PM	2/9/89	1	X	S	X
R	015	AM	2/9/89	1	X	S	X
R	017	AM	2/9/89	1	X	S	X
R	017	PM	2/9/89	1	X	S	X
R	020	AM	2/9/89	1	X	S	X
R	020	PM	2/9/89	1	X	S	X
R	021	AM	2/9/89	1	X	S	X
R	099	AM	2/9/89	2	X	S	X
R	099	PM	2/9/89	2	X	S	X
S	599	14	2/15/89	1	X	N	A
S	LLX	12	2/15/89	1	X	N	A
S	LYM	13	2/15/89	1	X	N	A
S	DJK	16	2/15/89	1	X	N	A
S	ERL	11	2/15/89	1	X	N	A
S	EWN	15	2/15/89	1	X	N	P
S	UT1	09	2/15/89	1	X	N	A
S	HTG	09	2/15/89	1	X	N	A
S	IT5	15	2/15/89	1	X	N	P
S	LK2	14	2/15/89	1	X	N	P
S	LL7	10	2/15/89	1	X	N	A
S	662	11	2/15/89	2	X	N	P
S	XZ8	10	2/15/89	2	X	N	P
S	XZ8	15	2/15/89	2	X	N	P
S	628	15	2/15/89	X	J	N	P
S	HZ7	13	2/15/89	X	A	N	T
S	GJ8	15	2/15/89	X	J	N	P
R	005	AM	2/16/89	1	X	N	X
R	005	PM	2/16/89	1	X	N	X
R	013	AM	2/16/89	1	X	N	X
R	017	AM	2/16/89	1	X	N	X
R	017	PM	2/16/89	1	X	N	X
R	024	AM	2/16/89	1	X	N	X
R	811	PM	2/16/89	2	X	N	X
R	812	PM	2/16/89	2	X	N	X
C	001	RO	2/22/89	X	X	E	X
C	002	FL	2/22/89	X	X	E	X
C	005	RO	2/22/89	X	X	E	X
C	006	RO	2/22/89	X	X	E	X
C	007	RO	2/22/89	X	X	E	X
C	011	RO	2/22/89	X	X	E	X
C	012	RO	2/22/89	X	X	E	X
C	015	RO	2/22/89	X	X	E	X

TABLE VI-1 11 of 11

LOADTYPE	ROUTE OR LICENSE	AM/PM, TYPE, OR TIME	SAMPLING DATE	RESIDENCE TYPE	GENERATOR TYPE	DESTINATION OR ORIGIN	VEHICLE TYPE
S	041	12	3/5/89	1	X	S	P
S	240	13	3/5/89	1	X	S	A
S	416	15	3/5/89	1	X	S	P
S	601	14	3/5/89	1	X	S	P
S	721	11	3/5/89	1	X	S	A
S	764	10	3/5/89	1	X	S	A
S	HH9	13	3/5/89	1	X	S	P
S	CMY	12	3/5/89	1	X	S	A
S	GJ9	16	3/5/89	1	X	S	P
S	LG7	13	3/5/89	1	X	S	P
S	XZ4	11	3/5/89	1	X	S	P
S	KHZ	13	3/5/89	1	X	S	A
S	PE1	14	3/5/89	1	X	S	P
S	RZ8	10	3/5/89	1	X	S	P
S	US9	11	3/5/89	1	X	S	P
S	959	12	3/5/89	X	J	S	P
S	HB8	12	3/5/89	X	J	S	P

C. DATABASE FIELD DESCRIPTIONS

Records maintained in the database contain a wide variety of load-specific information additional to the actual composition sampling results. Each record header provides for the capture of route, demographic and delivery characteristics of the sample. A description of the data fields and structure of each record follows.

STRUCTURE OF THE DATABASE

Each record consists of 74 fields of fixed size and type, requiring a total of 338 bytes per record. The database file is compatible with the dBase III Plus file construct. A complete description of all fields is given below.

The field types used include Character, Date, Numeric and Memo. The Character and Date field widths represent the total formatted width of the field. Dates are carried as "mm/dd/yy". Numeric field widths represent the total number of digits contained, including the decimal point, if applicable. Each record can have an associated Memo of up to 64K characters in length.

Six variables, initially set aside for future use, are contained in fields 14 to 19. Three numeric variables and three character variables are included in these extended variable fields. Fields 14 and 15 have been filled with census tract income levels for residential and self-haul loads, as applicable.

Field #	Field Name	Type	Width	Dec.	Description
1	LOADTYPE	C	1		Type of Load
2	RD1	C	3		Route Designator 1
3	RD2	C	2		Route Designator 2
4	DATE	D	8		Date Collected
5	RESTYPE	C	1		Residence Type
6	GENTYPE	C	1		Generator Type
7	DESTNATN	C	1		Load Destination/Origin
8	VECLTYPE	C	1		Vehicle Type
9	TRACT1	C	5		Census Tract 1
10	TRACT2	C	5		Census Tract 2
11	RECYCLE	C	1		Recycling ?
12	HAULER	C	1		Name of Hauler
13	NUMACCTS	N	3	0	# of Accounts
14	NV1	N	5	0	Num Var 1
15	NV2	N	5	0	Num Var 2
16	NV3	N	5	0	Num Var 3
17	CV1	C	3		Char Var 1
18	CV2	C	3		Char Var 2
19	CV3	C	3		Char Var 3
20	TOTLOADWT	N	6	0	Net Total Load
21	TOTSAMPWT	N	5	1	Net Total Sample

Field #	Field Name	Type	Width	Dec.	Description
22	NEWSPAP	N	5	1	Newspaper
23	CORRPAP	N	5	1	Corrugated Paper
24	COMPPAP	N	5	1	Computer Paper
25	OFFPAP	N	5	1	Office Paper
26	SCRAPAP	N	5	1	Mixed Scrap Paper
27	NRPAP	N	5	1	Other Paper
28	DIAPERS	N	5	1	Diapers
29	PETBOT	N	5	1	PET Bottles
30	HDPEBOT	N	5	1	HDPE Bottles
31	STYRO	N	5	1	Expanded Polystyrene
32	NRPLAS	N	5	1	Plastic Packaging
33	HARDPLAS	N	5	1	Other Plastics
34	NRBEER	N	5	1	Nonrefill Beer Bottles
35	REBEER	N	5	1	Refill Beer Bottles
36	NRPOP	N	5	1	Nonrefill Pop Bottles
37	REPOP	N	5	1	Refill Pop Bottles
38	CNTGLAS	N	5	1	Container Glass
39	NRGLASS	N	5	1	N/R Glass
40	ALCANS	N	5	1	Aluminum Cans
41	ALCONT	N	5	1	Aluminum Containers
42	TINCAN	N	5	1	Tinned Cans
43	BICANS	N	5	1	Bi-metal Cans
44	FERRMET	N	5	1	Ferrous Metals
45	WHTGDS	N	5	1	Large Appliances
46	NONFERR	N	5	1	Non-ferrous Metal
47	MIXMET	N	5	1	Mixed Metals
48	RUBBER	N	5	1	Rubber Products
49	TIRES	N	5	1	Tires
50	FOOD	N	5	1	Food
51	PRUNINGS	N	5	1	Prunings
52	LEAVES	N	5	1	Leaves and Grass
53	WOOD	N	5	1	Wood
54	TEXTILES	N	5	1	Textiles
55	LEATHER	N	5	1	Leather
56	ASH	N	5	1	Ashes
57	CHINA	N	5	1	Ceramics/China
58	ROCKS	N	5	1	Rocks/Concrete
59	FINES	N	5	1	Dirt/Sand/Fines
60	GYPSUM	N	5	1	Gypsum Wallboard
61	INSUL	N	5	1	Fiberglass Insulation
62	DEBRIS	N	5	1	Construction Debris
63	LATEX	N	5	1	Latex Paints
64	GLUE	N	5	1	Glues/Adhesives
65	SOLVENT	N	5	1	Oil-based paints
66	CLEANER	N	5	1	Cleaners
67	PESTS	N	5	1	Pesticides
68	BATTS	N	5	1	Batteries
69	GAS	N	5	1	Gasoline
70	OIL	N	5	1	Motor,Diesel Oil
71	ASBESTOS	N	5	1	Asbestos Products
72	EXPLODE	N	5	1	Explosives
73	CHEMICAL	N	5	1	Other Chemicals
74	MEMO	M	10		Commenets, etc...

INDIVIDUAL RECORD STRUCTURES

There are four particular types of sample loads represented within the database. These "LOADTYPEs" are:

Residential
Commercial
Commercial Pure
Self-haul

The database fields applicable to the records for each of these loadtypes are described below. Only the header information is listed, because all records contain a complete set of components (Fields 22 -73) and a memo field (Field 74).

Fields which are not applicable to an individual record, or contain missing values, are filled with an "X" or "-9" for Character and Numeric fields, respectively. Except for those records which include census tract income levels, all extended variables (Fields 14-19) have missing value identifiers in them.

RESIDENTIAL RECORDS:

Field #	Field Name	Type	Width	Dec	Description
1	LOADTYPE	C	1		Type of Load
2	RD1	C	3		Route Designator 1
3	RD2	C	3		Route Designator 2
4	DATE	D	8		Date Collected
5	RESTYPE	C	1		Residence Type
7	DESTNATN	C	1		Load Origin
9	TRACT1	C	5		Census Tract 1
10+*	TRACT2	C	5		Census Tract 2
11	RECYCLE	C	1		Recycling?
12	HAULER	C	1		Name of Hauler
13+	NUMACCTS	N	3	0	# of Accounts
14++	NV1	N	5	0	TRACT1 Median Income
15++	NV2	N	5	0	TRACT2 Median Income
20	TOTLOADWT	N	6	0	Total Load Weight
21	TOTSAMPWT	N	6	1	Total Sample Weight

\+ Not applicable to RESTYPE 2 (multi-family)
* Tract 2 pertains to RESTYPE 1 (single), and may or may not be applicable for an individual record
++ As applicable for individual record

COMMERCIAL RECORDS:

Field #	Field Name	Type	Width	Dec	Description
1	LOADTYPE	C	1		Type of Load
2	RD1	C	3		Route Designator 1
3	RD2	C	2		Route Designator 2
4	DATE	D	8		Date Collected
6	GENTYPE	C	1		Generator Type
7	DESTNATN	C	1		Load Destination
11	RECYCLE	C	1		Recycling?
12	HAULER	C	1		Name of Hauler
20	TOTLOADWT	N	6	0	Total Load Weight
21	TOTSAMPWT	N	6	1	Total Sample Weight

COMMERCIAL PURE RECORDS:

Field #	Field Name	Type	Width	Dec	Description
1	LOADTYPE	C	1		Type of Load
2	RD1	C	3		Route Designator 1
3	RD2	C	2		Route Designator 2
4	DATE	D	8		Date Collected
6	GENTYPE	C	1		Generator Type
7	DESTNATN	C	1		Load Destination
12	HAULER	C	1		Name of Hauler
20	TOTLOADWT	N	6	0	Total Load Weight
21	TOTSAMPWT	N	6	1	Total Sample Weight

SELF-HAUL RECORDS:

Field #	Field Name	Type	Width	Dec	Description
1	LOADTYPE	C	1		Type of Load
2	RD1	C	1		Route Designator 1
3	RD2	C	1		Route Designator 2
4	DATE	D	8		Date Collected
5+	RESTYPE	C	1		Residence Type
6+	GENTYPE	C	1		Generator Type
7	DESTNATN	C	1		Load Destination
8	VECLTYPE	C	1		Vehicle Type
9*	TRACT1	C	5		Census Tract 1
14++	NV1	N	5		TRACT1 Median Income

\+ One, or the other, as applicable (residential or commercial determination)
* Applicable only if residential, and if within City limits
++ As applicable for individual record

FIELD DEFINITIONS AND DESCRIPTIONS

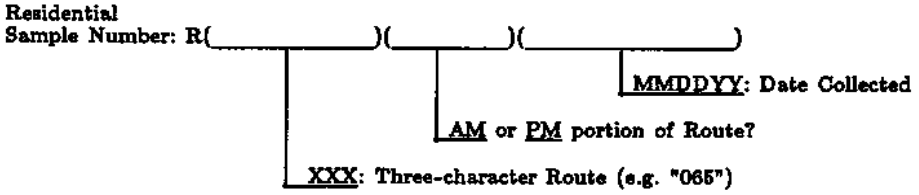
Each field will accept only those values or characters which are specified as valid input variables. The valid entries and allowable ranges for each field are given below. A definition of the field is also given.

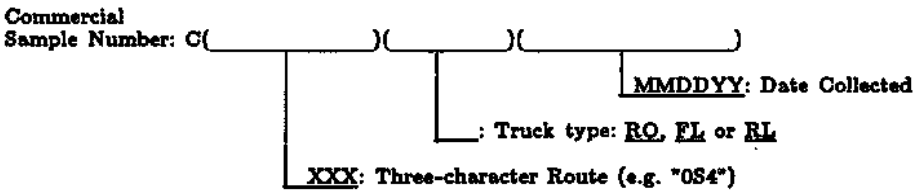
Field #	Field Name	Valid Inputs
1	LOADTYPE Load Type	R = Residential C = Commercial P = Commercial Pure S = Self Haul
2	RD1 (See Note Below) Route Designator 1	
3	RD2 (See Note Below) Route Designator 2	
4	DATE Date load was collected (not necessarily date of sample sorting)	MM/DD/YY

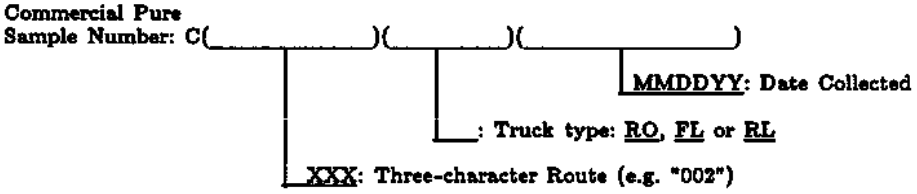
NOTE: SAMPLE NUMBERS

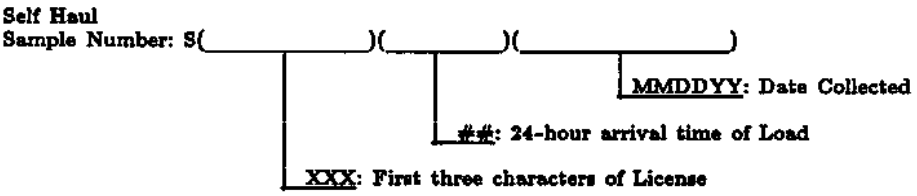
The first four fields collectively form the "Sample Number" of each record. Each Sample Number is unique, providing the user with a reference identifier for any given record, both during data collation and program use. When utilized within WSCS, the Sample Number is created from these four fields. There is no "Sample Number" field, per se. These fields are also the four sorting keys used by the program to sequentially store unprocessed data. The default sorting hierarchy is by DATE, LOADTYPE, RD1 and RD2. All data entry files and primary databases are organized according to these keys.

The allowable valid inputs for the RD1 and RD2 fields are specific to the LOADTYPE of each record. Route Designator 1 can be any combination of three numbers or letters signifying the route number for all but Self Haul samples. Self Haul samples use this field for the first three vehicle licence characters. Route Designator 2 identifies whether the AM or PM portion of a Residential route was sampled. For Commercial and Commercial Pure loads, RD2 represents the truck type: Roll Off, Front Loader or Rear Loader. The 24-hour arrival time designation is contained in this field for Self Haul samples. The construction of "Sample Numbers" is given below:









5	RESTYPE Residence Type	1 = Single Family 2 = Multi Family X = Not Applicable
6	GENTYPE Commercial Generator Type	A = Manufacturer B = Wholesaler C = Retailer D = Restaurant/Eatery E = Hotel/Motel/Inn F = Office - Private or Government G = Health Facility H = Educational Institution I = Transportation Shop J = Other Service K = Mixed Generator Types X = Not Applicable
7	DESTNATN Origin or destination of load	S = South Transfer Station or residential service area N = North Transfer Station or residential service area C = Newcastle Landfill B = Bayside Disposal's yard E = Evergreen (Seattle Disposal's yard)

8	VECLTYPE Type of Self Haul Vehicle which delivered the load	A = Passenger Auto (passenger plates) P = Pickup Trucks, Vans (truck plates) T = Other Trucks, and cars with trailers (truck plates) X = Not Applicable
9	TRACT1	##### - a five-digit number
10	TRACT2 Census Tract(s) from which Residential or Self Haul sample was collected	corresponding to one of 130 possible census tracts. Two decimals are implied. Two tracts may be listed for each Residential Single Family Load, or one for each Self Haul Residential Load within City limits. X = Not Applicable
11	RECYCLE For Residential: For Commercial:	Y = Yes N = No X = Not Applicable Was Curbside Recycling in effect? Would the Hauler normally divert this load for recycling?
12	HAULER Name of residential, commercial, or commercial pure Contract Hauler	B = Bayside Disposal S = Seattle Disposal G = General Disposal U = US Disposal X = Not Applicable
13	NUMACCTS Approximate Number of Residential Accounts served by the load	### - from 1 to 999 -9 = Not Applicable

14, 15, 16	NV1, NV2, NV3 Numerical Variable 1 Numerical Variable 2 Numerical Variable 3	#####--a five-digit numerical variable reserved for future use. (filled with "-9" identifier) EXCEPT: Single-family residential and residential self-haul within City limits contain TRACT1 and TRACT2 Median Income in NV1 and NV2, respectively.
17, 18, 19	CV1, CV2, CV3 Character Variable 1 Character Variable 2 Character Variable 3	XXX--a three-character alpha-numeric variable reserved for future use. (Filled with "X" identifier)
20	TOTLOADWT Total Net Weight in pounds of the Load from which the sample was taken	###### - up to a maximum of 999,999 lbs.
21	TOTSAMPWT Total Net Weight in pounds of the Sample, derived from the sum of all component weights	####.# - up to a maximum of 9,999.9 lbs.
22 ... 73	COMPONENTS Net Weight in pounds of Sample Component	###.# - up to a maximum of 999.9 lbs
74	MEMO Field sampling comments, notes and miscellaneous information about the sample	Any and all text narrative is allowed in this field. This field is not an active processing field; it is part of the total historical record of the sample.