Champaign County Solid Waste Management Plan

PART I
SOLID WASTE CHARACTERISTICS

Prepared by the
Intergovernmental Solid Waste Disposal Association
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SECTION ONE: Waste Generation

Introduction

In 1986, the Illinois Solid Waste Management Act (PA 84-1319) was signed into law. The Solid Waste Management Act established a hierarchy for solid waste management for local governments in the State. That hierarchy, and its objectives, were stated as follows:

> It is the purpose of this Act to reduce reliance on land disposal of solid waste, to encourage and promote alternative means of managing solid waste, and to assist local governments with solid waste planning and management. In furtherance of those aims, while recognizing that landfills will continue to be necessary, this Act establishes the following waste management hierarchy, in descending order of preference, as State policy:
>
> (1) volume reduction at the source;
> (2) recycling and reuse;
> (3) combustion with energy recovery;
> (4) combustion for volume reduction;
> (5) disposal in landfill facilities.

In order to assist local governments in the complex task of implementing this management hierarchy, the State of Illinois established a solid waste planning grant program. The Intergovernmental Solid Waste Disposal Association (ISWDA), was one of the first entities in the State to receive a grant under this program.

The Solid Waste Planning and Recycling Act (PA 85-1198) became effective January 1, 1989. The intention of the Act was to further clarify the directives for local solid waste planning and management. The Solid Waste Planning and Recycling Act requires the following information be included in local plans:

(1) A description of the origin, content and weight or volume of municipal waste currently generated within the County's boundaries, and the origin, content, and weight or volume of municipal waste that will be generated within the County's boundaries during the next 20 years, including an assessment of

the primary variables affecting this estimate and the extent to which they can reasonably be expected to occur.

(2) A description of the facilities where municipal waste is currently being processed or disposed of and the remaining available permitted capacity of such facilities.

(3) A description of the facilities and program that are proposed for the management of municipal waste generated within the County's boundaries during the next 20 years, including, but no limited to their size, expected cost and financing method.

(4) An evaluation of environmental, energy, life-cycle cost and economic advantages and disadvantages of the proposed waste management facilities and programs.

(5) A description of the time schedule for the development and operation of each proposed facility of program.

(6) The identity of potential sites within the County where each proposed waste processing, disposal and recycling facility will be located or an explanation of how the sites will be chosen. For any facility outside the county that the County proposes to utilize, the plan shall explain the reasons for selecting such facility.

(7) The identity of the governmental entity that will be responsible for implementing the plan on behalf of the county and explanation of the legal basis for the entity's authority to do so.

The purpose of this part of the Champaign County Solid Waste Management Plan is to establish the basic planning information required by PA 85-1198. The information will provide an illustration of historic trends in solid waste management in the County. Moreover, it provides an assessment of wastestream composition and management. From this information, management options can be established and a preferred system can be selected.

Waste Composition

The Cities of Champaign and Urbana have attempted various solid waste disposal solutions, both jointly and separately. At first, the intergovernmental cooperation centered

upon Champaign, Urbana and associated unincorporated areas. Later, the scope extended to planning for Champaign County. This expansion led to the formation of fist the Intergovernmental Task Force and ultimately the ISWDA.

In 1974, there were seven operating landfills in Champaign County: City of Champaign, Chanute Air Force Base, Hartman (near St. Joseph), Johnston (near Fisher), Village of Rantoul, City of Urbana, and Whetzel (north of Champaign). By the end of 1988, only the Rantoul landfill continued to operate and accept municipal waste. The first detailed solid waste management study in Champaign County was completed in 1974. It was prepared by Daily & Associates for the Champaign County Regional Planning Commission and was entitled Champaign County Solid Waste Management Study. However, this study did not address the issue of wastestream composition nor were any weigh programs conducted.

Champaign County has had two waste composition studies conducted in the past fifteen years - in 1977 and one in 1985. both of these studies indicated that the solid wastestream in champaign County was similar to national composition of solid waste. In addition, weigh programs in 1979, 1985, 1988 were conducted at operating landfills in Champaign County. The 1979 study was only a two-day weigh study conducted for the Champaign-Urbana Solid Waste Disposal System (CUSWDS) by Black and Veatch Engineers. More detailed studies were done by Gershman, Brickner and Bratton Inc. (GB&B) and reported in the Long Range Solid Waste Management Plan for Champaign County (1986).

The scope of each study was slightly different, reflecting the needs and purposes at the time. The studies report solid waste characteristics that re comparable but differ in the components chosen, method of analysis and presentation of the data. Limitations prevented seasonal examination of waste composition, but attempts by the various engineering firms were made by examining volume records of the landfill operators. Since scales have never been permanently installed at either the Rantoul or Urbana landfills, weigh data was estimated from volume records and density assumptions.

1977 Studies

The engineering firm of Black and Veatch surveyed solid waste entering the CUSWDS (Urbana) landfill during the week of June 13, 1977. Solid waste was characterized by using weigh data collected during the study and twelve months of volume records. Trucks of licensed haulers, representing 80% of the total waste hauled to the landfill during the study week, were weighed. Refuse delivered by non-licensed waste haulers, contractors, individuals and some licensed waste haulers was not weighed. Density was determined for two classes of waste described as "packed" and "loose". Packed waste was defined as commercial and residential waste collected in packer garbage trucks. Loose waste was defined as uncompacted materials such as construction/demolition wastes, yard wastes, and rubble brought in by pick-ups, semi trailers, dump trucks and similar vehicles. The weights and densities for the survey week are given in Table 1.

Characterization of waste was made by sorting representative samples. The data was reported in percentages by weight of paper, glass, ferrous metal, aluminum, other non-ferrous metals, plastics, rubber and leather, textiles, wood, food waste, yardwaste, miscellaneous organics and miscellaneous waste. The low yardwaste percentage was explained by dry conditions previous to and during the study period. Commercial loads containing a large number of cardboard boxes were avoided during the study period. Therefore, reported paper quantities for the commercial sector may be low. The compositional breakdown of the waste is shown in Table 2, and compares closely with national averages projected by USEPA for the period.

TABLE 1

Weekly Weight Summary Of Solid Waste At Urbana Landfill, June 1977[1]

	Tons of Waste	Percent of Total
Packed Waste		
Weighed Packed Waste	943	45.7%
Estimated Unweighed Packed Waste[2]	208	13.6%
Subtotal	1,223	59.3%
Loose Waste		
Weighed Loose Waste	148	7.2%
Estimated Unweighed Loose Waste[3]	693	33.5%
Subtotal	841	40.7%
Weekly Total	**2,064**	**100.0%**

(1) Conducted during the week of June 13, 1977.

(2) Based on average density of 470 lbs per cubic yard.

(3) Based on average density of 310 lbs per cubic yard.

TABLE 2

Composition Of Non-Bulky Solid Waste At Urbana Landfill, June 1977[1]

	Percent Composition				
	Nationwide	Champaign-Urbana[2]			
	Average[3]	Total	Residential	Commercial	Mixed[4]
Paper and Paper Products	39.6%	40.8%	39.0%	31.8%	50.4%
Yardwaste	14.1%	6.6%	10.2%	--	2.0%
Food Waste	13.3%	15.2%	13.2%	21.0%	16.5%
Glass	10.2%	10.0%	8.0%	16.5%	10.7%
Ferrous Metal	8.8%	8.0%	8.6%	6.5%	7.6%
Rubber, Leather, Textiles	4.3%	3.5%	3.6%	3.8%	2.5%
Plastics	4.1%	5.4%	4.7%	5.0%	7.2%
Wood	3.6%	2.7%	2.5%	8.1%	--
Misc. Inorganics	1.5%	4.1%	4.9%	6.5%	0.9%
Aluminum	0.8%	1.8%	2.2%	0.5%	1.6%
Miscellaneous	--	1.4%	2.4%	--	--
Total	100.0%	100%	100.0%	100.0%	100.0%

(1) Non-bulky solid waste originates from residential, commercial, industrial and institutional activities.

(2) National average as reported in the "Third Report to Congress: Resource Recovery and Waste Reduction" U.S. Environmental Protection Agency; Washington, D.C. 1975.

(3) Personal communication, To: A. Richard Trautman, C-U Solid Waste Disposal Systems, From: I.T. Schaper, Black & Veatch, July 18, 1977.

(4) Residential and commercial waste mixed together.

1985 Studies

Gershman, Brickner and Bratton, Inc., a consulting firm, contributed a composition report on wastes entering the Rantoul and CUSWDS (Urbana) landfills. The data was gathered by visual inspections. Residential and commercial wastes were reported by components. A detailed breakdown of bulky wastes into subcategories of household appliances, earth/ash, construction/demolition and tires is presented in Table 3. Mass data for Rantoul was converted from volume estimates by assuming 400 pounds per cubic yard and was given for fiscal year 1978-79 through fiscal year 1984-85. The study, however, found the average density to have been 705 pounds per cubic yard. This was 56% greater than was estimated. The percent of the wastestream, by origin and based on weight, was also given for the Rantoul landfill: Rantoul-85.35%, Fisher-4.10%, Thomasboro-3.76%, Ludlow-2.2%, St. Joseph-1.40%, other Champaign County municipalities-1.3% and outside Champaign County-1.9%. The corresponding wastestream by origin for Urbana was given as: Champaign-56.45%, Urbana-22.94%, University of Illinois-15.71%, Mahomet-1.41%, unincorporated areas and small villages-0.88%, Rantoul-0.50%, Sadorus-0.50%, Homer-0.47%, Philo-0.46%, Savoy-0.42%, Bondville-0.15%, and outside Champaign county-0.12%.

Disposal operations of the Rantoul and Urbana landfills were also described. Average densities, based on the 1977 and 1979 studies of incoming waste, were given for each year from 1977 to 1984. The densities ranged from 464 to 469 pounds per cubic yard which were about 26% higher than the previous density assumptions. The densities derived from the 1985 weigh programs are shown in Tables 4 and 5.

1988 Studies

The most recent weigh information available was generated by a program conducted in November 1987 and January 1988 by ISWDA Staff and the Firm of Brown, Vence and Associates (with their subcontractor Franklin Associates, Inc.). Two weeks were chosen,

TABLE 3

Waste Composition Observed During The Urbana And Rantoul Landfill Weighing Program, 1985[1]

Category	Percent Composition[2]		
	Rantoul	Urbana	Total
Non-Bulky Solid Waste			
Residential	39.5%	31.6%	33.3%
Commercial	9.0%	11.8%	11.2%
Cardboard	4.3%	3.4%	3.5%
Leaves/Brush	2.5%	2.4%	2.4%
Wood	3.6%	1.0%	1.6%
Organics	0.9%	1.7%	1.5%
Metallics	2.4%	0.5%	0.9%
Furniture	0.4%	0.9%	0.8%
Paper	0.2%	0.4%	0.4%
Textiles	---	0.1%	0.1%
Glass	---	---	---
Plastics	---	---	---
Other	7.2%	1.1%	2.4%
Subtotal	**70.0%**	**55.0%**	**58.2%**
Bulky Solid Waste			
Construction/Demolition	20.7%	23.4%	22.9%
Earth/Ash/Fill	8.3%	21.0%	18.2%
Tires/Rubber	0.8%	0.4%	0.5%
Major Household Appliances	0.2%	0.2%	0.2%
Subtotal	**30.0%**	**45.0%**	**41.8%**
Total	**100.0%**	**100.0%**	**100.0%**

(1) The weigh program was conducted July 15-20, 1985 at the Rantoul Landfill and July 22-27, 1985 at the Urbana Landfill.

(2) This composition assessment was based on visual observations made during the weighing program and not on the results of a hand-sorting program. Residential waste is made up of constituents such as paper, glass, metals, etc. which are inherently within the residential waste fraction reported. This table should not be compared with Table 2.

TABLE 4

Solid Waste Tonnage Received During The Urbana And Rantoul Landfill Weighing Program, 1985[1]

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total	Avg TPD[2]
Rantoul								
Non-Bulky[3]	166	66	133	74	119	28	586	84
Bulky[3]	31	68	68	35	35	5	242	34
Total	**197**	**134**	**201**	**109**	**154**	33	**828**	**118**
Urbana								
Non-Bulky[3]	400	263	296	281	297	130	1,667	238
Bulky[3]	225	240	421	282	153	28	1,349	193
Total	**625**	**503**	**717**	**563**	**450**	**158**	**3,016**	**431**

(1) The weigh program was conducted July 15-20, 1985 at the Rantoul Landfill and July 22-27, 1985 at the Urbana Landfill.

(2) Average Tons Per Day is based on seven days per week, even though waste was received only six days per week. The Average Tons Per Day was based on seven days per week in order to normalize waste generation over 365 days per year.

(3) Bulky waste includes major household appliances (white goods); earth, ash or fill materials; construction/demolition debris; and tires. Non-bulky waste includes all other discards.

TABLE 5

Density Distribution Of Waste Received During
The Urbana And Rantoul Landfill Weigh Program, 1985

Urbana Landfill			
Date	Volume (Cubic Yards)	Weight (Tons)	Density (Lbs per Cubic Yard)
June 22	2,180	589	540
June 23	1,790	495	553
June 24	1,952	711	729
June 25	1,904	560	589
June 26	1,661	451	543
June 27	630	160	506
Total	**10,117**	**2,966**	
Average			586
Rantoul Landfill			
Date	Volume (Cubic Yards)	Weight (Tons)	Density (Lbs per Cubic Yard)
June 15	538	197	733
June 16	350	134	763
June 17	498	217	871
June 18	384	109	566
June 19	446	154	691
June 20	176	33	377
Total	**2,392**	**844**	
Average			705

one in November of 1987 and one in January of 1988, in which all the incoming waste to the Urbana landfill was weighed. It should be noted that there was a considerable range in the data, particularly with regards to the construction/demolition waste. The quantities of construction/demolition waste generated fluctuate more than residential and commercial waste; this is due to on housing starts, commercial and industrial development and weather conditions. These conditions can cause the generation rate to vary by as much as 200% on a monthly basis. Volume data collected by the operators of both the Rantoul and Urbana landfills was translated into weigh data using the density factors collected during the study. An estimate of total waste generated in the county was made using density factors and information gathered during the study. The generation rate calculations also accounted for net exported waste and recycled materials in both the public and private sectors.

In November, 1987, the average density for the week was 720 pounds per cubic yard compared to 560 pounds per cubic yard in January, 1988. This difference was caused by major demolition projects which occurred in November of 1987. The density figures from January were probably closer to the average. Therefore, for the 1988 analysis, an average of 600 pounds per cubic yard was used. This density was in agreement with the results of the various weigh programs in July 1985 at the Urbana and Rantoul landfills which found densities of 586 and 705 pounds per cubic yard, respectively. The densities obtained from the programs in 1985 and in 1988 were considerably higher than earlier values used for calculating trends. The earlier data (465 pounds per cubic yard) was developed from a two-day weigh program on October 1 and 2, 1979. The 1985 and 1988 data is more consistent with national figures. Tables 6 and 7 show the monthly tonnage records, in cubic yards, of the Rantoul and Urbana landfills for 1987. Two one-week weigh programs at the Urbana landfill provided density factors that were used to convert the volume data to weigh data. A summary of factors developed is shown in Table 8 and 9. the last full year of operation for both in-county landfills was 1987. A complete discussion of the 1988 weigh program can be found in Appendix One.

TABLE 6

Waste Received At Rantoul Landfill, 1987

Month	Total Waste (Cubic Yards)	Total Waste (Tons)[1]
January	8,040	2,412
February	8,676	2,603
March	10,925	3,278
April	10,977	3,293
May	9,510	2,853
June	8,174	2,452
July	9,144	2,743
August	8,861	2,658
September	8,959	2,688
October	9,387	2,816
November	8,495	2,548
December[2]	8,470	2,541
Total	**109,618**	**32,885**

(1) Converted using 600 Lbs per Cubic Yard.

(2) December data is from 1986.

Source: Village of Rantoul Municipal Landfill Monthly Records.

TABLE 7

Waste Received At Urbana Landfill, 1987

Month	Loose Waste (Cubic Yards)	Packed Waste (Cubic Yards)	Brush (Cubic Yards)	Total (Cubic Yards)	Total (Tons)[1]
January	8,965	10,205	299	19,469	5,984
February	9,642	8,744	1,093	19,479	5,958
March	16,619	9,732	1,186	27,537	8,567
April	10,933	9,168	1,645	21,746	6,629
May	15,371	10,728	1,991	28,090	8,622
June	13,670	9,378	2,428	25,476	7,765
July	14,536	8,447	3,252	26,235	7,962
August	14,858	10,648	2,606	28,112	8,564
September	12,874	10,848	2,096	25,818	7,855
October	14,977	10,719	2,792	28,488	8,665
November	12,566	10,437	6,672	29,675	8,641
December[2]	7,843	6,889	2,289	17,021	5,090
Total	**152,854**	**115,943**	**28,349**	**297,146**	**90,302**

(1) Densities Assumed:
Loose Waste = 640 Lbs per Cubic Yard (includes construction/demolition waste)
Packed Waste = 580 Lbs per Cubic Yard
Brush = 440 Lbs per Cubic Yard

(2) December data is from 1986.

Source: City of Urbana, Landfill Ticket Summary.

TABLE 8

Densities of Champaign County Waste By Type Of Delivery

Type of Delivery	Density (Lbs per Cubic Yard)
Total Waste	
November[1]	720
January[2]	560
Average[3]	600
Loose Waste	
November[1]	938
January[2]	586
Average[3]	660
Packed Waste	
November[1]	604
January[2]	558
Average[4]	580

(1) As weighed in November, 1987 at the Urbana Landfill.

(2) As weighed in January, 1988 at the Urbana Landfill.

(3) Average is weighted toward January, 1988 because of the unusually large quantities of demolition waste received in November, 1987.

(4) Average of November, 1987 and January, 1988 densities.

TABLE 9

Density Of Champaign County Waste By Type Of Waste

Type of Waste	Density (Lbs per Cubic Yard)
Total Waste	
November[1]	720
January[2]	560
Average[3]	600
Residential Waste	
November[1]	507
January[2]	506
Average[4]	507
Commercial Waste	
November[1]	536
January[2]	472
Average[4]	500
Construction/Demolition Waste	
November[1]	1,360
January[2]	751
Average[3]	880
Yardwaste	
November[1]	462
January[2]	345
Average[4]	440

(1) As weighed in November, 1987 at the Urbana Landfill.

(2) As weighed in January, 1988 at the Urbana Landfill.

(3) Average is weighted toward January, 1988 because of the unusually large quantities of demolition waste received in November, 1987.

(4) Average of November 1987 and January 1988 densities.

The weigh program also collected data on the origin of waste delivered to the Urbana landfill. During the November 1987 weigh period, the origin of waste coming to the landfill was: University of Illinois-33%, Champaign-32%, Urbana-32%, and Champaign County-2%. In January of 1988, these values were: Champaign-42%, University of Illinois-30%, Urbana-26%, and Champaign County-3%.

Waste Generation

Based on waste composition studies and weigh programs conducted during the past fifteen years, Champaign County appears to approximate national trends for material distribution in the wastestream. Moreover, increasing densities mirror the trend in the solid waste industry nationwide in terms of utilization of collection vehicles with increasing compaction efficiencies. The variation and seasonality of yardwaste in Champaign County also appear to conform to patterns observed elsewhere in the United States.

The only apparent variation in Champaign County's wastestream is a consistent and sizeable construction/demolition fraction in the wastestream. In this regard, Champaign County appears to differ with national trends. The Solid Waste Handbook (1986) estimated that urban areas generate approximately 0.72 pounds per capita day of construction/demolition debris. The Champaign County figure is 1.84 pounds per capita day. The generation of construction/demolition debris is more directly a function of construction activity rather than population growth. With the presence of large on-going capital improvement programs (especially by the University of Illinois) and a consistent and stable economic growth pattern, it does not appear that the construction/demolition fraction will diminish soon.

Non-hazardous waste consists of residential, commercial and institutional wastes which together are commonly referred to as municipal solid waste, industrial waste, and construction/demolition waste. A knowledge of the quantity and composition of the non-hazardous wastestream is essential for the planning of new or expanded recycling

programs, collection programs, volume reduction facilities and landfill development. For this plan, a combination of two methods was used to estimate waste generation. First, a materials flow formula which was developed to calculate municipal solid waste generation in the United States was modified with specific data for Champaign County. Second, volume data maintained by the two landfills in the County were translated to a weight basis using density factors developed from the 1988 weigh programs. The total waste generated in the County was then estimated by summing all waste being landfilled in the County plus the exported waste plus the waste being recycled in 1987. The last full year of landfill operation, 1987, served as a check against the estimated generation rates.

The materials flow methodology used for estimating municipal solid waste generation was derived from Characterization of Municipal Solid Waste in the United State, 1960-2000 (1986) prepared by Franklin Associates, Inc. Briefly described, the methodology relies on traditionally published data which document production or consumption of materials and products that enter the municipal wastestream. U.S. Department of Commerce statistics were used for much of the data, with trade association data used occasionally. Adjustments were made, where appropriate, for converting losses of materials in manufacturing processes, imports, exports and for products that were destroyed in use or diverted rom the wastestream for long periods of time. The generation of three major recyclable components of the wastestream -- newspapers, corrugated containers and office papers -- was calculated specifically for Champaign County. The details of the calculations for each material are described in Appendices Two, Three and Four.

Table 10 displays the estimated quantity and composition of solid waste generated in Champaign County in 1988. Waste quantities were calculated by category from generation rates in pounds per capita day. As shown in Table 10, an estimated 197,800 tons per year (6.25 pounds per capita day) of solid waste was generated in Champaign County. This consisted of about 107,000 tons per year (3.39 pounds per capita day) of

TABLE 10

Estimated Waste Generation And Composition By Sector In Champaign County, 1988[1]

Wastestream Type	Calculated Generation Tons Per Year
Residential/Commercial	
Large Bulky Items	7,313
Newspapers	7,121
Office Papers	3,157
Corrugated Boxes	14,128
Other Papers	19,394
Glass	9,856
Ferrous Metals	5,087
Aluminum	1,590
Other Products[2]	5,405
Plastics	6,677
Yardwaste	17,487
Food/Misc. Organics	9,793
Subtotal	107,008
Processible Construction/Demolition[3]	29,859
Non-Processible Construction/Demolition[4]	28,357
Industrial	13,026
TOTAL	197,809
Treatment Sludge[5]	
Wastewater	3,277
Water Supply	16,282
Subtotal	19,559

(1) Adapted from: "Solid Waste Management Feasibility Analysis for Champaign County, City of Champaign and City of Urbana." Brown, Vence and Associates, May, 1988.

(2) Includes non-ferrous metals, rubber, leather and textiles.

(3) Processible construction/demolition waste includes wood, paper, metal, cardboard and concrete.

(4) Non-Processible construction/demolition waste includes dirt, rock, masonry and cement.

(5) Illinois EPA, Division of Water Pollution Control. Expressed in dry tons.

residential and commercial waste, 13,000 tons (0.41 pounds per capita day) of industrial waste, 58,200 tons (1.84 pounds per capita day) construction/demolition waste and 19,559 tons (0.61 tons per capita day) of treatment sludge. The 1988 waste generation is displayed graphically in Figures 1 and 2.

This waste generation data was developed from national data and modified for Champaign County. The industrial and construction/demolition data were obtained from landfill data and interviews with haulers and landfill operators. The treatment sludge data was established based on actual values reported to the Illinois Environmental Protection Agency for 1988. These values cover all reported sludge generated by water supply, municipal wastewater or industrial wastewater treatment facilities.

The 1988 residential and commercial generation factor of 3.39 pounds per capita day in Table 10 is about 2% below the estimated 1987 national average of 3.46 pounds per capita day. The newspaper and office paper generation rates, which were calculated for Champaign County at 0.23 and 0.09 pounds per capita day, respectively, compare favorably to national averages of 0.29 and 0.11 pounds per capita day. The national average generation rate for corrugated boxes of 0.43 pounds per capita day is very close to the calculated Champaign County value of 0.44 pounds per capita day. As previously discussed, quantities of demolition and construction wastes are highly dependent on the specifics of the community and national averages are of little value. Values reported in the various location across the country range from 0.12 to 3.52 pounds per capita day for construction/demolition waste generation. However, the Champaign County solid wastestream appears to have a consistently higher per capita contribution of construction/demolition waste than the national average.

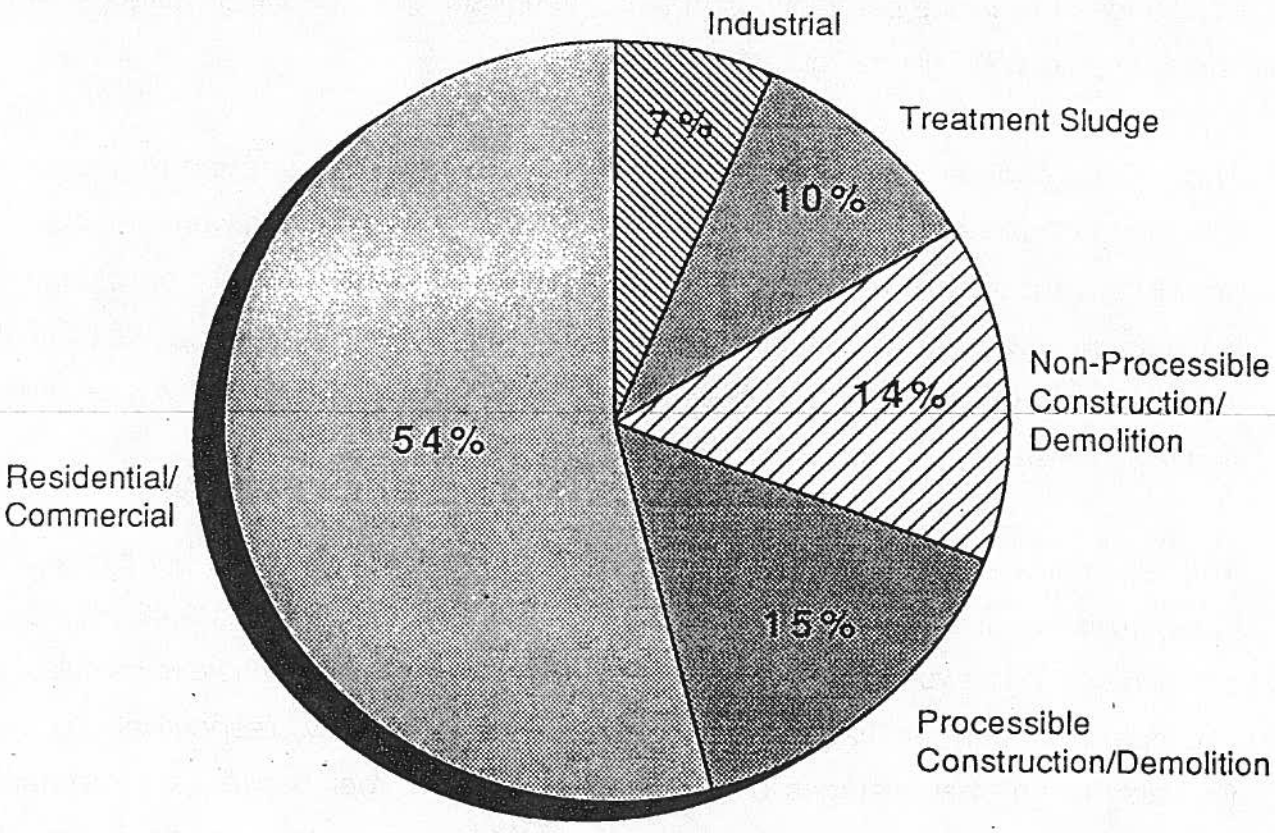


FIGURE 1

Non-Hazardous Solid Waste Generated:
Champaign County, 1988

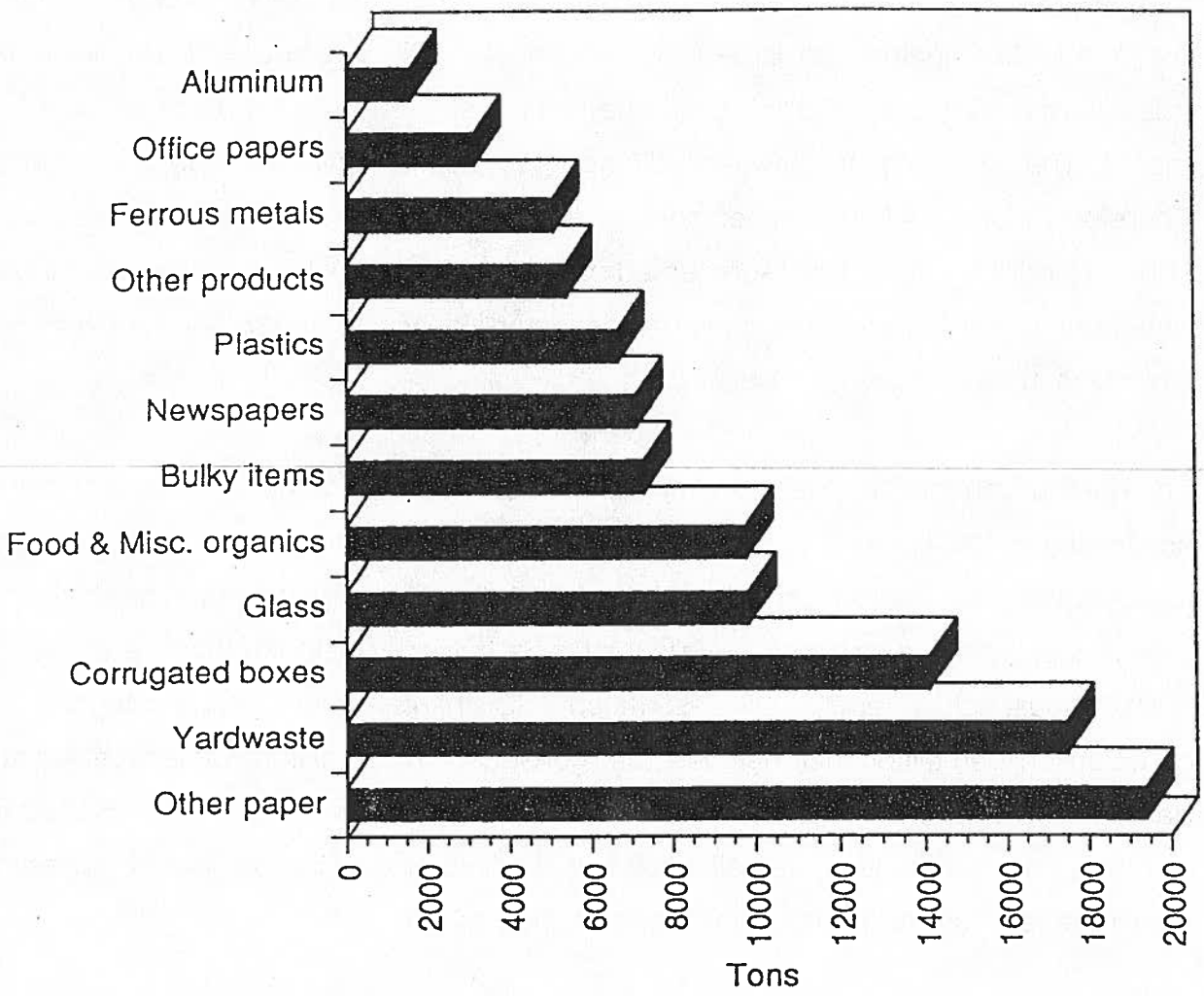


FIGURE 2

Composition of Municipal Solid Waste Generated:
Champaign County, 1988

The Urbana landfill received 1,216 tons of construction/demolition waste in November, 1987 weighing week and 858 tons in the January, 1988 week. Several large demolition projects in Champaign and Urbana in November, 1987 resulted in an unusually high quantity of construction/demolition waste being disposed of in the Urbana landfill that month. The January quantity was used for purposes of estimating annual generation rate. Therefore, about 44,600 tons of construction/demolition waste was disposed in the Urbana landfill in 1987. This represented over 77% of the construction/demolition waste generated in the County. The construction/demolition waste generation for Champaign County in 1988 is shown in Table 10.

The Rantoul construction/demolition waste was estimated from their annual volumes and an density of 880 pounds per cubic yard, an estimate based on the Urbana weighing data. In 1987, the Rantoul Landfill received 109,618 cubic yards of waste, of which about 35% was categorized as "trash". While the "trash" category included things such as large bulky household items, an estimated 80 percent of that category was construction/demolition material. The total construction/demolition waste received at the Rantoul landfill in 1987 was 13,500 tons. The total for the two landfills was 58,100 tons in 1987. The construction/demolition waste received at the Rantoul landfill represented approximately 13% of the total generated in the County.

An additional interpretation of the construction/demolition wastestream was performed to determine the processible and non-processible fractions. The interpretation was based on the observed density of construction/demolition waste and nationally reported composition volumes. Nationally, the reported composition of materials classified as construction/demolition debris, by volume is: 12% cardboard; 10% metals; 33% wood; 25% rock/dirt and 11% other materials (masonry, concrete). The observed density of local construction/demolition debris during the 1987-1988 weigh program averaged 1,055 pounds per cubic yard. The non-processible fraction was estimated first. This was done using the average weight of a cubic yard of dirt - 3000 lbs. The total tonnage of construction/demolition waste in 1988 was estimated at 58,100. Using the weight for dirt

and the volume distribution, the non-processible fraction was determined to be 49%, by weight, of the construction/demolition wastestream. The remaining 51%, by weight, of the construction/demolition wastestream would consist of metals, wood, cardboard and other materials which would be processible. The processible portion could be recycled while the non-processible portion is clean fill an is not recyclable.

The Long Range Solid Waste Management Plan for Champaign County, prepared by Gershman, Brickner & Bratton, Inc. in 1986, estimated industrial solid waste generation at 19 tons per day in 1985. This represents only non-hazardous wastes; hazardous wastes and reprocessed scrap was excluded from the calculations. These figures were adjusted for growth and updated to 1988. The 1985 industrial waste was bout 6% of the total daily waste generation while updated estimates have industrial waste compromising about 6.5% of the total wastestream. The majority of industrial waste in Champaign County is generated in the Champaign-Urbana area.

Small Quantity Hazardous Waste

In 1976 Congress passed the Resource Conservation and Recovery Act (RCRA), which directed the U.S. Environmental Protection Agency to develop and implement a program to protect human health and the environment from improper hazardous waste management practices. USEPA first focused on large companies which generate the greater portion of hazardous waste. Establishments producing less than 1,000 kilograms (2,200 pounds) of hazardous waste in a calendar month, known as small quantity generators (SQGs), were exempted from most of the hazardous waste regulations published by USEPA in May 1980. In November 1984, the Hazardous and Solid Waste Amendments (HSWA) to RCRA were signed into law. With these amendments, Congress directed USEPA to establish new requirements that would bring the small quantity generators into the regulatory system.

The residential/commercial and industrial waste estimated in the Champaign County Solid Waste Management Plan does not include any hazardous waste including SQG volumes. The owners and operators of small businesses may not even be aware that the material they are using requires special disposal and may inadvertently place hazardous materials in their dumpsters. Some businesses may also deliberately place hazardous material in with their regular garbage due to the high cost of proper disposal. In either case, the result is a quantity of hazardous material in the residential/commercial wastestream. It was necessary to estimate the potential quantities of this type of material for planning purposes.

The amount of hazardous waste attributed to small quantity generators originates from a variety of small to medium size businesses and industries. Types include:

- vehicle maintenance firms,
- metal manufacturers and metal finishers (including electroplating and printed circuit boards),
- construction companies,
- printing companies,
- photographic processors, and
- laundries and dry cleaners.

Other businesses affected by the SQG RCRA regulations include educational and vocational shops, analytical and clinical laboratories, and pesticide applicators. The most common hazardous wastes produced by SQGs are:

Waste Types	**Examples**
Acids/bases	Various acids, ammonium hydroxide, sodium hydroxide
Ignitable wastes	Acetone, n-butyl alcohol, ethyl ether, methyl alcohol, xylene

Solvents	Perchloroethylene, isopropyl or ethyl alcohol, trichloroethylene
Pesticides	Aldicarb, aldrin, DDT, Dieldrin
Spent plating wastes	Cyanide, heavy metals, solvents
Ink sludge	Ink sludge with chromium or lead
Reactives	Hypochlorites, sulfides
Lead acid batteries	Lead dross, spent acid
Dry cleaning residues	Spent filter cartridges, solvent distillation residues

The estimate of SQG hazardous waste in Champaign County was developed based on a national survey conducted by USEPA. This survey identified 23 industrial groups which characteristically generated hazardous waste. The USEPA also assigned an average generation rate to each industrial group. Within each group, the average generation rate was broken down into a variety of specific hazardous wastes typically generated by each industrial group.

The number of establishments in Champaign County within these 23 industrial groups was calculated using the County Business Patterns, 1984. Small businesses were those establishments which employed less than 250 employees. To adjust those figures to the 1988 base year, an annual growth rate of 3% was used. The distribution of businesses in Champaign County within the 23 industrial categories is found in Table 11. There were 835 businesses in Champaign County that could be small quantity generators. The largest industry group was vehicle maintenance with 342 businesses that might be generating small quantities of hazardous waste. The next largest category was construction, with 211 establishments.

In 1988, approximately 3,612 tons of hazardous waste were estimated to have been generated by SQG's activities. The amount by industrial category is shown on Table 11 and Figure 3. This total includes waste oil. Vehicle maintenance was estimated to account for approximately 80% of the total generated amount of small quantity hazardous waste. This was mostly waste oil,with solvents contributing secondary amounts. The

next largest generator was the Metal Manufacturing industrial group accounting for approximately 8% of the total SQG tonnage.

Based on USEPA survey data, the type of small quantity hazardous waste was also estimated. These estimates are shown in Figure 4. Waste oil, the single largest item, accounted for approximately 66% of the total hazardous waste generated followed by inorganic wastes, such as used car batteries, accounting for about 18%. All other materials were third and solvents ranked fourth accounting for 6% of the total tonnage.

Vehicle maintenance and metal manufacturing are the two industrial groups which generate waste oil. Gasoline service stations generated the most waste oil, approximately 964 tons in 1988. Motor freight transportation or trucking were next, generating 436 tons in 1988. The local vehicle maintenance establishments interviewed estimated a volume of 6 tons per year of waste oil, this falls within the range of 1.6 tons and 11.3 tons identified in the USEPA Survey.

TABLE 11

Estimated Quantity Of Hazardous Waste Generated By Small Quantity Generators In Champaign County, 1988[1]

Industrial Group	Number of Generators in Champaign County[2]	Quantity in Tons[3]
Pesticide End Users	7	6
Pesticide Application Services	32	33
Chemical Manufacturing	*	8
Formulators	*	4
Laundries	17	18
Other Services	18	14
Photography	15	33
Vehicle Maintenance	342	2904
Equipment Repair	24	14
Metal Manufacturing	36	307
Construction	211	98
Furniture\Wood Manufacturing and Refinishing	*	1
Printing\Ceramics	58	48
Other Manufacturing	8	21
Analytic and Clinical Laboratories	31	42
Educational and Vocational Shops	*	2
Wholesale and Retail Sales	36	29
Total	**835**	**3,612**

(1) Adapted from "Final Report: Solid Waste Management Feasibility Analysis for Champaign County, City of Champaign and City of Urbana", Brown, Vence and Associates. May 1988.

(2) Based on 1984 County Business Patterns.

(3) Estimated from 1986 base data. Inflated at 2% per year to 1988

* Data suppressed to avoid disclosure.

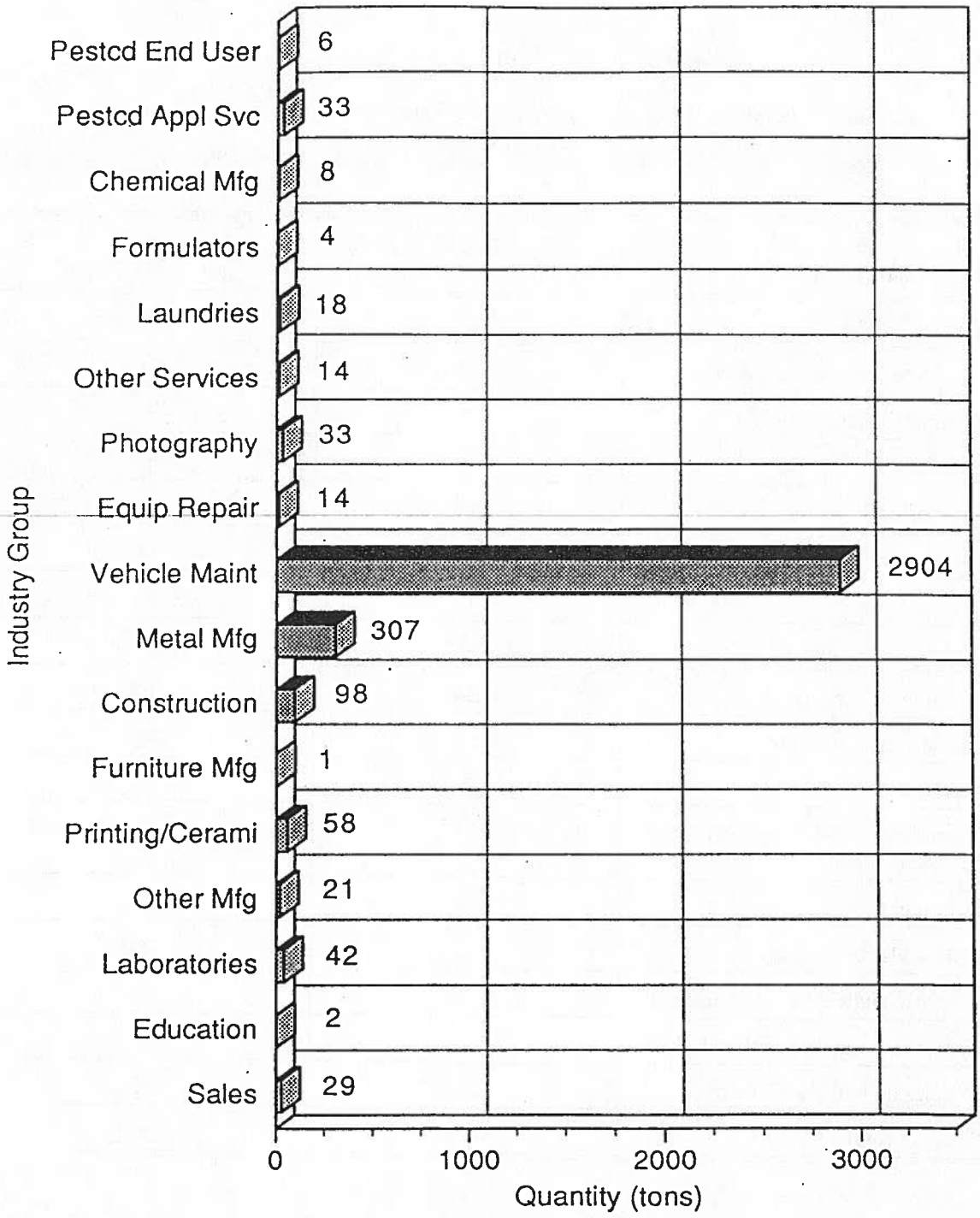


FIGURE 3

Estimated Generation of Small Quantity Hazardous Waste:

By Industry Group in Champaign County, 1988

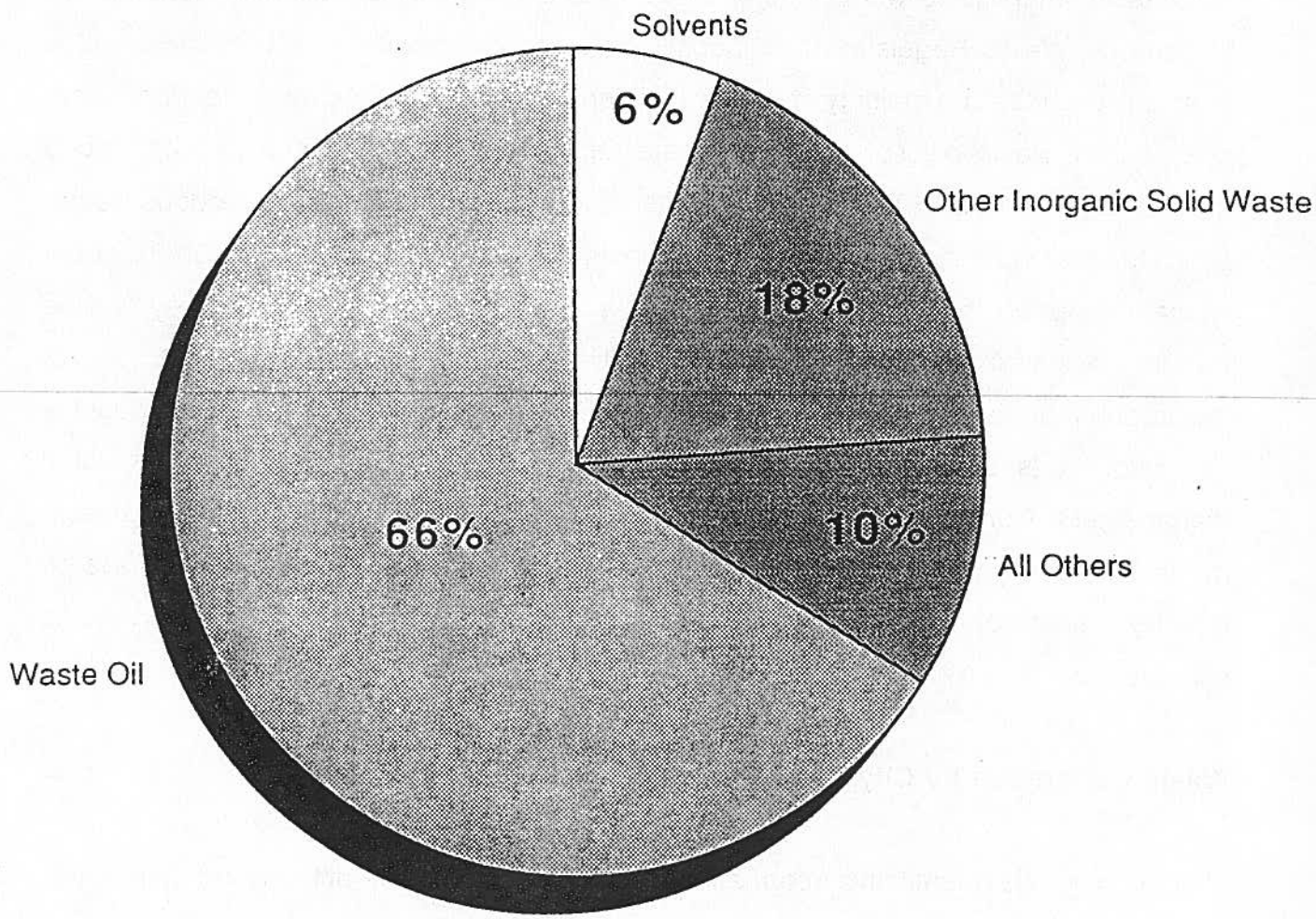


FIGURE 4

Estimated Generation of Small Quantity Hazardous Waste:
By Material Type in Champaign County, 1988

A local survey was conducted on three types of small quantity generators in order to reveal characteristic behavior of the small quantity generator. Two-thirds of the businesses interviewed were not familiar with the USEPA's Small Quantity Generator of Hazardous Waste Regulations. Disposal of hazardous waste was consistent within industrial groups. The majority of vehicle maintenance shops participated in periodic pick-ups of their waste oil, solvents and waste batteries. Such practices do not require manifesting quantities. The photo labs interviewed disposed of their hazardous waste, typically silver sludge and other solutions down the drain into the sewer. Dry cleaners typically reported that their waste is picked up. The full results of this survey can be found in Appendix Five. The University of Illinois manifests approximately 5 tons of hazardous material per month. This quantity qualifies the University as a large quantity generator; it is subject to all Federal and State regulations for hazardous waste management. Currently, the University utilizes many management options including waste minimization, recycling and proper disposal. Because of the University's status as a large quantity generator, The University's hazardous waste were not included in these calculations.

Waste Generation by City and Township

There is very little quantitative information available regarding the difference in generation rates between rural and urban areas of the County. The Illinois EPA, in its 1988 Annual Capacity Report, made estimates for waste generation by distinguishing between urban and non-urban counties. Based on their report, urban counties generate residential, commercial and industrial waste at the rate of 5.5 pounds per capita day and non-urban counties generate 4.7 pounds per capita day. The waste generation data in Table 10 are in agreement with the Illinois EPA estimates when sludge is excluded. Illinois EPA's estimates did not include sludge.

The difference in generation rates between urban and non-urban areas is a result of the type and size of commercial activities. For example, most of the major restaurants,

shopping malls, hospital, colleges and other institutions, which are used by urban and non-urban residents alike, are located in urban areas. Based on the assumption that the Illinois EPA distinctions in rural and urban estimates were applicable, estimates of the distribution of solid waste generation in the County were developed. The pattern of distribution of solid waste was prepared for each township.

The rural rate established by the Illinois EPA was about 85% of the urban rate. Given a combined urban/rural generation rate for residential and commercial wastes (excluding industrial, construction/demolition and sludge waste) in Champaign County of 3.39 pounds per capita day in 1988 and the ratios of urban and rural population and assuming that the rural generation rate is 85% of the urban generation rate the urban and rural generation rates were estimated. The urban generation rate estimate was 3.50 pounds per capita day. The rural generation rate estimate was 2.99 pounds per capita day. Using the population distributions and urban generation rate, 70% of the waste generated in Champaign County originates in the municipalities of Champaign, Urbana and Rantoul. If the urban townships of Champaign and Urbana are added,m 80% of the solid waste in the county is generated in the three municipalities and the two townships. The remaining townships were designated rural. Table 12 shows waste generation by township and Figure 5 illustrates the distribution.

The industrial and construction/demolition waste generation rates were estimated by assuming that all of this waste originated in the municipalities of Champaign, Rantoul and Urbana and the Townships of Champaign, Mahomet and Urbana (see Table 12). The majority of industrial activity is located in the Champaign-Urbana and Rantoul areas and therefore most of the industrial waste is generated in the same area. The source of construction/demolition waste depends on where demolition projects are taking place at the time. Like industrial waste, most of this waste is generated in areas of activity. Mahomet township was assumed to be a growth area and was therefore assigned a portion of the industrial and construction/demolition waste but was assumed to be rural with regards to the generation of residential and commercial wastes.

TABLE 12

Estimated Distribution Of Municipal Solid Waste In Champaign County By City And Township, 1988[1]

	1988 Population[2]	Tons per Year	Percent
Municipalities			
Champaign[3]	59,332	37,898	35.4%
Urbana[3]	36,772	23,488	21.9%
Rantoul[3]	20,942	13,377	12.5%
Townships			
Ayers	486	266	0.2%
Brown	1,579	865	0.8%
Champaign[3]	7,500	4,791	4.5%
Colfax	364	199	0.2%
Compromise	1,700	931	0.9%
Condit	476	261	0.2%
Crittendon	354	194	0.2%
East Bend	880	482	0.5%
Harwood	739	405	0.4%
Hensley	1,245	682	0.6%
Kerr	192	105	0.1%
Ludlow	970	531	0.5%
Mahomet	7,945	4,350	4.1%
Newcomb	749	410	0.4%
Ogden	1,680	920	0.9%
Pesotum	1,032	565	0.5%
Philo	1,609	881	0.8%
Rantoul	2,238	1,225	1.1%
Raymond	536	293	0.3%
Sadorus	1,174	643	0.6%
St. Joseph	3,775	2,067	1.9%
Scott	1,053	577	0.5%
Sidney	1,599	875	0.8%
Somer	1,316	721	0.7%
South Homer	1,670	914	0.9%
Stanton	516	283	0.3%
Tolono	3,745	2,050	1.9%
Urbana[3]	9,009	5,754	5.4%
TOTAL	**173,177**	**107,008**	

(1) Average generation rate is 3.39 lbs per capita per day.

(2) U.S. Bureau of Census, Current Population Reports, Local Population Estimate, 1986, inflated for population growth in 1988.

(3) An urban generation rate of 3.5 lbs per capita per day was assumed. At all other locations a rural generation rate of 3.00 lbs per capita per day was assumed.

(4) Construction/demolition waste generation rate excludes clean fill waste disposed on-site, estimated at 28,357 tons per year.

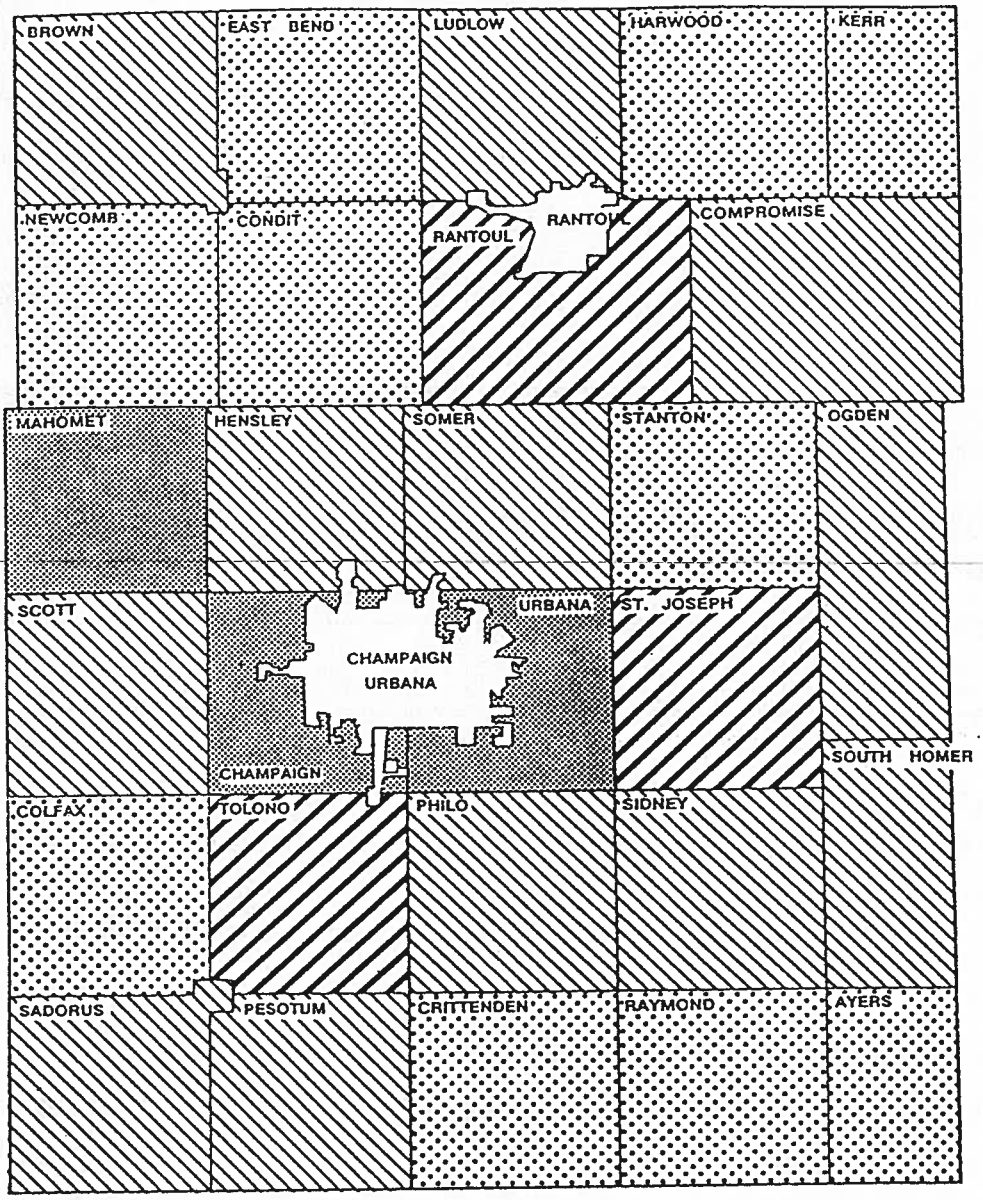


FIGURE 5

Estimated Distribution of Residential and Commercial Waste:

By City and Township, Champaign County, 1988

Waste Quantity Projections

During the past fifteen years, there have been three studies that projected trends in solid waste generation in Champaign County. There was a wide variation in the projections as shown in Table 13.

TABLE 13

Previous Solid Waste Projections For Champaign County In Tons

Study	1975	1980	1985	1990	1995	2000	2005
Daily and Associates[1]	197,100	231,300	279,300	338,600	400,800	475,900	-----
Gershman, Brickner & Bratton[2]	-----	-----	187,975	189,169	191,805	194,440	-----
Brown, Vence and Assoc.[3]	-----	-----	-----	179,975	185,110	190,433	195,951

(1) "Champaign County Solid Waste Management Study", Daily and Associates, December, 1974. Excludes sludge.

(2) "Long Range Solid Waste Management Plan for Champaign County", Gershman, Brickner & Bratton, Inc., March, 1986. Excludes sludge.

(3) "Solid Waste Management Feasibility Analysis for Champaign County, City of Champaign and City of Urbana", Brown, Vence and Associates, May, 1988. Excludes sludge.

Waste generation in the future depends on a number of factors, some of which are very difficult to quantify. These factors include population, increasing affluence and social changes which affect purchases of goods. Some technological changes may increase the amount of waste generated while others may decrease it. For example, computers with high-speed printers can increase the amount of waste paper generated. Conversely, lightweight aluminum and plastics are replacing heavier steel and glass in containers and packaging.

To determine how the generation of waste will change, the 1986 Franklin Associates, Inc. report to the USEPA Characterization of Municipal Solid Waste in the United States, 1960-2000 was used. In the report, Franklin Associates, Inc. indicated that the amount of gross discards has been increasing steadily since 1960. It was further anticipated that this growth would increase by an additional 8.4% during the period between 1987 and

2000. This translates to approximately 0.6% per year compounded annually. This rate was used to project solid waste increases in Champaign County resulting from increased consumption during the period between 1988 and 2010.

Population is also a major determinant of waste generation. To determine the population change in Champaign County, information from the Census Bureau and the Illinois Bureau of the Budget was used. The Census Bureau reported a 1.3% total growth from 1980 to 1985 or an annual growth rate of about .26%. However, from 1984 to 1986, the Census Bureau reported a 1% decline in population. The Illinois Bureau of the Budget uses an estimate of 3% total population growth from 1985 to 2000. This equals an annual average growth rate of 0.2%. This is in line with the information from the Census Bureau for 1980 to 1985. A growth rate of 0.2% was used to project population increases in Champaign County during the period between 1988 and 2010.

The industrial waste category is the fraction of Champaign County's wastestream which contains manufacturing rejects of off-specification products which are not considered a special waste according to Illinois EPA. An initial value of 0.41 pounds per capita day was derived from observation of loads arriving at area landfills during the weigh programs conducted in 1985, 1987 and 1988. It was also compared to industrial employment data. Industrial (durable and non-durable goods) manufacturing employed approximately 7,200 people in 1988. This per capita generation figure was held constant and projected growth was linked to the overall population growth.

Construction/demolition debris was calculated based on weigh program data collected in 1985, 1987 and 1988. Based on the weigh data, the estimated per capita generation rate for construction/demolition waste was 1.84 pounds per capita day. This was split between the processible and nonprocessible portion of the wastestream.

The final projected wastestream category was treatment plant sludge. Sludge can be generated by industrial or publicly owned treatment works (POTW), water supply

treatment plants and septic tanks. There are no industrial wastewater treatment plants operating in Champaign County. Since the majority of the County's population is served by sanitary sewers, for projection purposes, septage (septic tank cleaning sludge) was assumed to be land applied or processed at a wastewater treatment plant. No area landfills indicated that they accepted septage for disposal. A figure of 0.61 pounds of treatment sludge per capita day was derived from 1988 data supplied by Illinois EPA. This was projected to increase in direct proportion to population growth.

Based on these assumptions and observation, the total per capita solid waste generation rate for Champaign County in 1988 was estimated to be 6.25 pounds per day. This includes sludge and construction/demolition waste contributions. This is comparable to reported values from other counties in Illinois as shown in Table 14. It should be noted that none of the other counties included treatment sludge. This is because their data was prepared prior to Illinois EPA's October, 1989 interpretation of waste types that are to be included for recycling rate calculations.

Based on these projection assumptions and per capita generation rates, the estimated 1988 base year total solid waste tonnage for Champaign County was 197,809. The total municipal solid waste tonnage is projected to increase to 222,258 tons in the year 2010. The results of these estimates and projections can be found in Table 15 and Figure 6.

TABLE 14

Selected Per Capita Generation Rates

Reported In Illinois During 1988
In Pounds Per Person Per Day

	Residential/ Commercial	Industrial	Construction/ Demolition	Sludge	Total Pounds[1]
Champaign County	3.39	0.41	1.84	0.61	6.25
Will County[2]	3.14	0.98	0.82	----	4.94
DuPage County[3]	3.90	1.10	0.80	----	5.70
Lake County[4]	3.20[5]	3.60[6]	1.70	----	8.50
IEPA[7]	----	----	----	----	5.50[8]

(1) Pounds per person per day.

(2) Will County Interim Solid Waste Plan, December, 1988.

(3) DuPage County Solid Waste Recycling Study, September, 1987.

(4) Lake County Solid Waste Management Plan, April, 1989.

(5) Does not include commercial waste.

(6) Includes commercial waste.

(7) Available Disposal Capacity for Solid Waste in Illinois: Second Annual Report, October, 1988.

(8) Values include per capita contributions from residential, commercial and industrial sources. Excludes treatment sludge. The value used for urban counties is 5.5 pounds per capita per day and the value for rural counties is 4.7 pounds per capita per day. Champaign County is considered an urban county by IEPA.

TABLE 15

Estimated Solid Waste Tonnage Generated in Champaign County, 1988-2010[1]

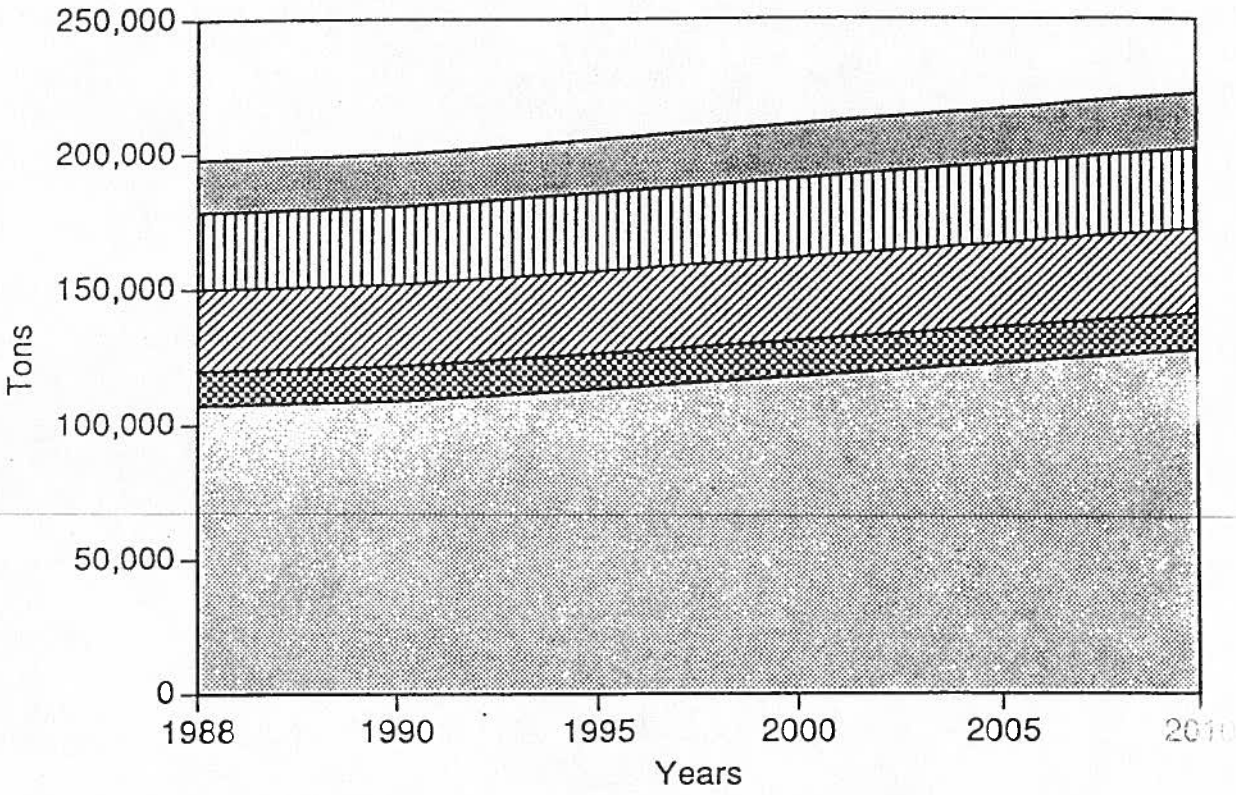
Waste Type	1988	1990	1995	2000	2005	2010
Residential/Commercial[2]	107,008	108,838	113,136	117,840	122,613	127,807
Pounds Per Capita Day	3.39	3.43	3.53	3.64	3.75	3.87
Industrial	13,026	13,076	13,209	13,342	13,476	13,611
Pounds Per Capita Day	0.41	0.41	0.41	0.41	0.41	0.41
Processible Construction/-Demolition	29,859	29,979	30,280	30,584	30,891	31,201
Pounds Per Capita Day	0.94	0.94	0.94	0.94	0.94	0.94
Non-Processible Construction/Demolition	28,357	28,470	28,756	29,045	29,336	29,631
Pounds Per Capita Day	0.90	0.90	0.90	0.90	0.90	0.90
Treatment Sludge[3]	19,559	19,637	19,835	20,034	20,235	20,438
Pounds Per Capita Day	0.61	0.61	0.61	0.61	0.61	0.61
Total Tons	197,809	199,590	204,799	210,428	216,125	222,258
Tons Per Day	542	547	561	577	592	609
Total Population	173,177	173,870	175,616	177,389	179,160	180,959
Total Pounds Per Capita Day	6.25	6.29	6.39	6.50	6.61	6.73
Base Tonnage For Recycling Calculations[4]	169,452	171,120	176,043	181,383	186,789	192,627
Recycling Rate at 15%	25,418	25,668	26,406	27,207	28,018	28,894
Recycling Rate at 25%	42,363	42,780	44,011	45,346	46,697	48,575

(1) Adapted from "Solid Waste Management Feasibility Analysis for Champaign County, City of Champaign and City of Urbana." Brown, Vence and Associates, May, 1988.

(2) Includes University of Illinois.

(3) Projected from data supplied by the Illinois Environmental Protection Agency, Division of Water Pollution Control.

(4) Calculated by subtracting the non-processible (dirt/rock) portion of the construction/demolition waste stream.



- Residential/Commercial
- Industrial
- Processible Construction/Demolition
- Non-Processible Construction/Demolition
- Treatment Sludge

FIGURE 6

Estimated Growth of Solid Waste:
By Type in Champaign County, 1988-2010

SECTION TWO: Waste Disposal

Introduction

Solid waste disposal in Champaign County occurs by either on- or off-site landfilling or on-site incineration. The majority of solid waste, approximately 126,837 tons or 64% of the total in 1988, was landfilled. With the closure of the Urbana landfill, the majority of this disposal takes place out-of-country (81% of the total landfilled). On-site landfilling of clean fill (concrete, dirty brick or rubble) is the second most common disposal option. In 1988, about 9,877 tons of this type of material was disposed of on-site. this occurs primarily at construction sites. On-site incineration is the third type of disposal activity as approximately 3,576 tons were incinerated in 1988. Some non-hazardous industrial waste is incinerated on-site as is most of the municipal and medical wastes generated at area hospitals. The distribution of disposal is shown in Figure 7. On-site incineration or other types of on-site disposal accounted for 6% of the 1988 total.

In 1988, approximate 59,524 tons of solid waste were recycled in Champaign County. This is about 30% of all of the solid waste generated in the County (See Figure 7). These recycling activities are discussed later in this document as well as in Part III, Recycling of the Champaign County Solid Waste Management Plan.

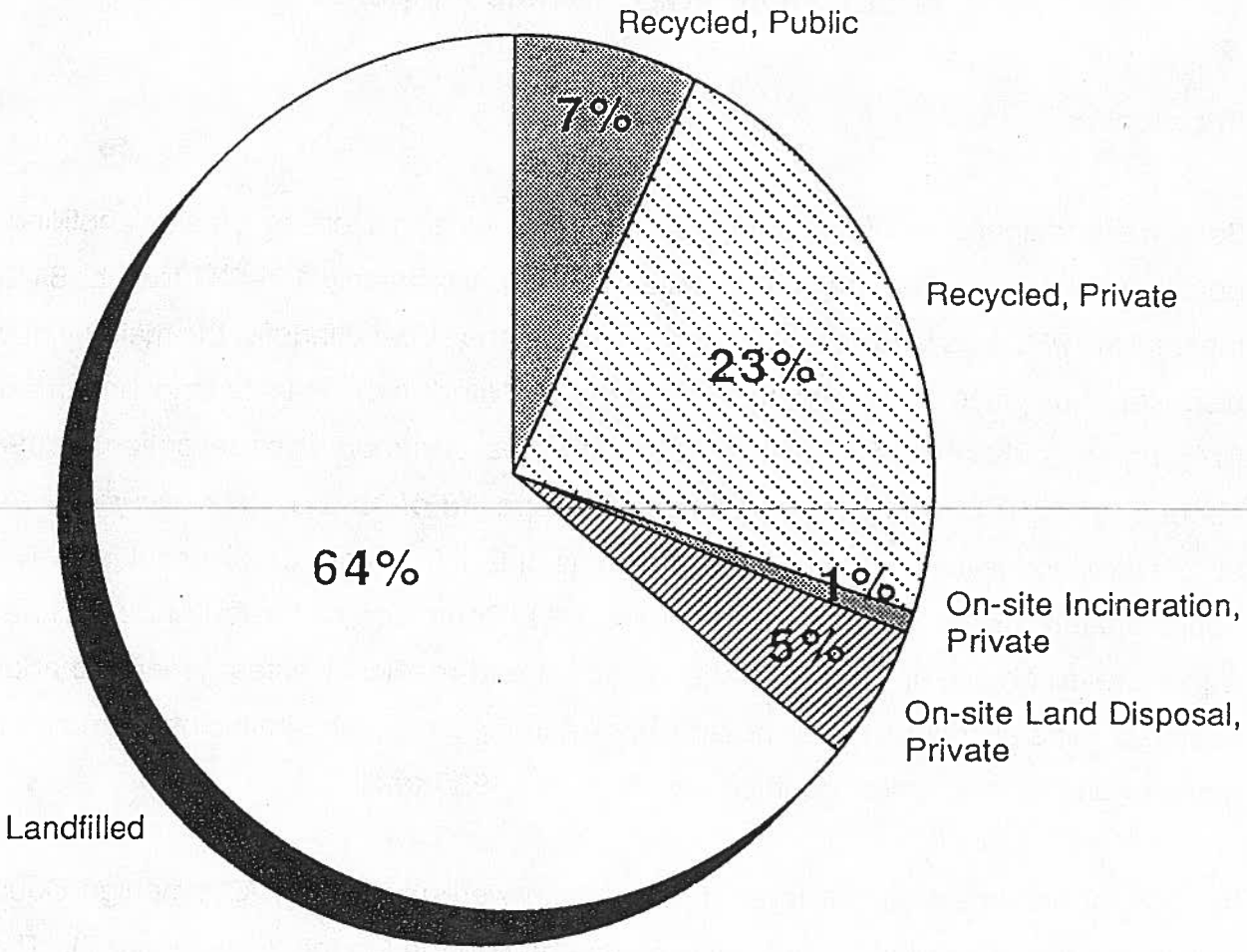


FIGURE 7

Distribution of Solid Waste Management Disposal Practices:
Champaign County, 1988

Amount of Waste Landfilled

Solid waste management in Champaign County has been provided by private collection and public disposal. Traditionally, private collectors operate with no franchising. Municipalities have developed their own landfills and charged tipping fees. Before passage of the Illinois Environmental Protection Act, most municipalities had their own small landfill. All of these landfills closed in the early seventies. The only permitted landfills in Champaign County were those operated by the Village of Rantoul and the Cities of Champaign and Urbana. When the Champaign landfill closed in 1976, the Champaign-Urbana Solid Waste Disposal System (CUSWDS) was formed for the purpose of jointly developing a landfill. CUSWDS developed and operated a landfill in Urbana which closed in November of 1988. The only permitted landfill in Champaign County is operated by the Village of Rantoul. The pattern of landfill usage in Champaign County for the period 1980-89 is shown in Table 16.

Landfilling is currently the primary disposal method used in Champaign County as it is elsewhere in Illinois. However, this dependence is significantly less than elsewhere in Illinois. Of the 197,809 tons of solid waste produced annually in the County, 126,837 tons, or 64%, were disposed of in area landfills. This is in contrast to the statewide average of 95% disposal of solid waste by landfilling. There are five area landfills that currently receive waste from Champaign County and only one, the Rantoul landfill, is located in the County. This material is moved through the Monticello Transfer Station. The landfills used primarily by haulers from Champaign County, H & L #2 and Multi-County, are privately owned. No waste is currently being hauled into Champaign County from neighboring counties. The only Champaign County landfill (Rantoul) does not knowingly accept out-of-county waste except by special arrangement. During the two weeks when all incoming waste was weighed at the Urbana landfill, in November 1987 and January 1988, only 10 of 4,596 tons were identified as coming from outside Champaign County. The shift in reliance on out-of-county landfills since the closure of the Urbana landfills is shown in Table 17.

TABLE 16

Landfill Usage:
Champaign County, 1980-1989 [1]

Year	Total Tons	Urbana Landfill	Rantoul Landfill	Tons per Day[2]
1980	122,537	98,073	24,464	336
1981	114,905	99,607	15,298	315
1982	114,894	97,299	17,595	315
1983[3]	108,384	90,857	17,527	297
1984	115,384	98,139	17,851	318
1985	135,729	99,496	N/A	371
1986	125,504	92,002	N/A	343
1987	123,187	90,302[4]	32,885	337
1988[5]	117,248	84,100[4]	33,148	321
1989	32,801	- -	32,801	90

N/A: Not Available

(1) Data for the years 1980-1984 from the "Long Range Solid Waste Management Plan for Champaign County" by Gershman, Brickner and Bratton, Inc. March, 1986. A conversion factor of 465 pounds per cubic yard was used for Urbana for the 1980-1989 period. A conversion factor of 405 pounds per cubic yard was used for Rantoul until 1985 and then was increased to 700 pounds per cubic yard for the period 1985-1989. All data is operator estimated except 1985 and 1986 Urbana landfill tonnages.

(2) Based on 365 days per year.

(3) Yardwaste diversion started at Urbana Landfill in the Fall of 1983.

(4) Excludes yardwaste delivered to the landfill but diverted to the Yardwaste Reclamation Facility.

(5) The Urbana Landfill closed in November, 1988.

TABLE 17

Distribution Of Champaign County Waste In Area Landfills, 1988-1989

1988		
Facility	County	Percent of Total
Urbana Landfill[1]	Champaign	49.0%
Rantoul Landfill	Champaign	19.0%
Danville Landfill	Vermillion	11.0%
Villa Grove Landfill	Douglas	19.0%
Saybrook Landfill	McLean	1.0%
Macon County Landfill	Macon	0.01%
Total		99.0%[2]

1989		
Facility	County	Percent of Total
Rantoul Landfill	Champaign	19.0%
Danville Landfill	Vermillion	40.0%
Villa Grove Landfill	Douglas	39.0%
Saybrook Landfill	McLean	1.9%
Macon County Landfill	Macon	0.01%
Total		99.9%[2]

(1) Urbana Landfill closed November, 1988.

(2) Total does not add to 100% due to rounding.

Note: Yardwaste received but not disposed of at these landfills was not included in these figures.

Amount of Waste Incinerated

Some materials produced by industries are incinerated on-site instead of being recycled or landfilled. This is usually done with the intent of recovering energy for use at the facility. Materials disposed of in this way include all types of paper and cardboard because these materials have high BTU content. The ash is normally buried in special waste landfills, therefore, incinerated materials are not included as part of the municipal solid wastestream. Listed below are industrial incinerators in operation or planned by the end of 1990 and a brief description of the operations.

(1) Caradco Corporation is a woodworking factory in Rantoul whose products are wood windows and doors. Caradco burns its own sawdust in a 1,000 horsepower boiler which generates steam for space heating and for drying and curing wood. About 4,500 tons per year of sawdust are produced of which 2,025 tons are burned (45%). The remaining 2,475 tons (55%) are recycled and sold as a feed stock for other manufacturing processes.

(2) Carle Clinic installed a 9 ton per day incinerator with heat recovery. About 5,500 pounds of waste are burned daily, of which about 250 pounds are pathological wastes.

(3) Covenant Medical Center was formed by the merger of Burnham and Mercy Hospitals in 1989. The Burnham facility had a 1,500 pound per day incinerator under construction at the time of the merger. It will be tested in late 1989 or early 1990. An identical project for the Mercy facility will be completed and tested in mid-1990.

The industrial and medical waste incinerators combined remove about 3,576 tons per year or about 2% of the municipal solid wastestream. Caradco's waste is counted as non-hazardous industrial waste. The University of Illinois abandoned a planned 50 ton per day waste-to-energy plant in favor of material recovery at its transfer facility for paper, cardboard and other materials. This is part of a comprehensive plan to collect and recycle waste produced by the institution.

Other places where wastes are incinerated include Kraft, Inc. and the University of Illinois, both of which have Illinois EPA permits to burn solvent wastes in their boilers. These wastes are not permitted to be disposed of in sanitary landfills. However, they are not considered part of the municipal solid wastestream of the County, and have not been included in the wastestream analysis.

Amount of Waste Recycled

The collection, processing and marketing of recyclables in Champaign County is handled by numerous public, non-profit and private entities. Residentially and commercially generated wastes are handled by voluntary public programs including curbside collection in the Cities of champaign and Urbana, public drop-offs and buy-backs. The private entities have buy-back programs for aluminum and some other metals and collection programs for large quantity generators of cardboard such as grocery stores. Construction/demolition wastes are handled entirely by private sector operations that reuses concrete and asphalt for construction and roadway development. Recyclable industrial materials are handled by private collection companies. The majority of water and wastewater treatment plant sludge (96%) is sold or given away as agricultural soil conditioner.

The current public recycling programs (except yardwaste) in Champaign County process materials through the Community Recycling Center (CRC). Since CRC publishes an annual report of its activities, the quantities of materials collected by the public and non-profit programs are well documented. Private sector recycling is more difficult to characterize because of the many different entities recycling materials (e.g. solid waste haulers, scrap yards, retail shops and industries) and the proprietary nature of business information. For example, waste haulers do not routinely reveal information on the number of accounts they handle or income generated from those accounts. However, interviews with haulers and industrial generators indicate that the private sector recycled approximately the same amount of material from industrial and commercial sources as

the public/non-profit sector did from the residential and commercial wastestreams in 1988; 14,973 tons for the private sector compared to 11,427 tons for the public sector.

Additionally, it appears that about half of the processible construction/demolition debris generated in 1988 was recycled. Most of the 14,373 tons of recycled material was asphalt and concrete. This recycling was done exclusively by the private sector. Industrial recycling includes paper, packaging materials, cardboard, sawdust and other material (including non-metallic production scrap).

Virtually all (96%) treatment plant sludge in Champaign County is recycled by land application on area farms. Since the largest sludge generator, Northern Illinois Water Company, is a privately owned utility, the majority of sludge recycling (81%) in Champaign County is attributable to private sector activities.

Based ont he estimated 1988 solid waste tonnage, it was possible to establish Champaign County's base recycling rate. Fortunately, documentation of recycled tonnage is well supported in the case of public and non-profit efforts. Moreover, since recycling efforts among the public/non-profit and private sector are distinct, with little overlap, it is also possible to show recycling performance by material. For example, the public and non-profit sector handles most of the yardwaste, newspaper and glass. Conversely, the private sector handles the majority of all bulky white goods, corrugated cardboard, scrap metal and construction/demolition material recycling. As a result, there is little duplication of processing capability between the two sectors. This distinction is shown in Table 18 and Figure 8. Based on this Table, the estimated recycling rate for Champaign County was 30% or approximately 59,500 tons in 1988. If the non-processible construction/demolition wastestream is discounted, the 1988 recycling rate was 35%.

TABLE 18

Estimated Recycling Rate By Sector In Champaign County, 1988[1]

Wastestream Type	Calculated Generation Tons Per Year	Reported Recycled Tons Per Year Public[2]	Private[3]	Calculated Disposal Tons Per Year
Residential/Commercial				
Large Bulky Items	7,313	—	900	6,413
Newspapers	7,121	2,588	—	4,533
Office Papers	3,157	593	UNK	2,564
Corrugated Boxes	14,128	271	4,400	9,457
Other Papers	19,394	113	UNK	19,281
Glass	9,856	1,056	—	8,800
Ferrous Metals	5,087	495	3,609	983
Aluminum	1,590	354	11	1,225
Other Products[4]	5,405	—	120	5,285
Plastics	6,677	19	UNK	6,658
Yardwaste	17,487	5,523	—	11,964
Food/Misc. Organics	9,793	415[5]	UNK	9,378
Subtotal	107,008	11,427	9,040	86,541
Processible Construction/-Demolition[6]	29,859	—	14,373	15,486
Non-Processible Construction/Demolition[7]	28,357	—	—	28,357
Industrial	13,026	—	5,933	7,093
Treatment Sludge[8]				
Wastewater	3,277	2,524	—	753
Water Supply	16,282	316	15,911	55
Subtotal	19,559	2,840	15,911	808
TOTAL	197,809	14,267	45,257	138,285

(1) Adapted from: "Solid Waste Management Feasibility Analysis for Champaign County, City of Champaign and City of Urbana." Brown, Vence and Associates, May, 1988.

(2) Public Sector reported recycling tonnages from: "The Status of Recycling in Champaign-Urbana During 1988." Community Recycling Center, September, 1989; "Campus-Wide Recycling Program Report and Recommendations to the Vice-Chancellor for Administrative Affairs." University of Illinois Recycling Task Force, October, 1988; personal correspondence with Village of Rantoul Recycling Coordinator; and personal correspondence with Illinois EPA, Division of Water Pollution Control.

(3) Represents 1988 base information reported from interviews with private recyclers, commercial and industrial representatives.

(4) Includes non-ferrous metals, rubber, leather and textiles.

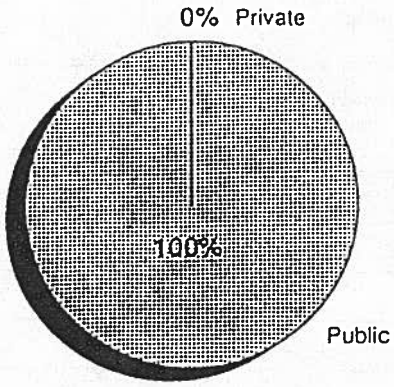
(5) Includes waste oil recycled by the University of Illinois and Community Recycling Center and Young Farmers.

(6) Processible construction/demolition waste includes wood, paper, metal, cardboard and concrete.

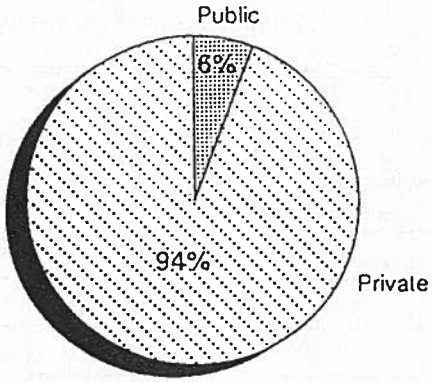
(7) Non-Processible construction/demolition waste includes dirt, rock, masonry and cement.

(8) Dry weight.

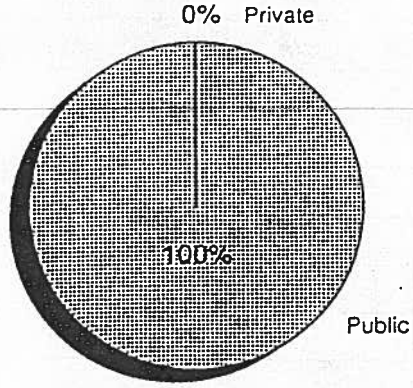
UNK - Unknown or not reported.



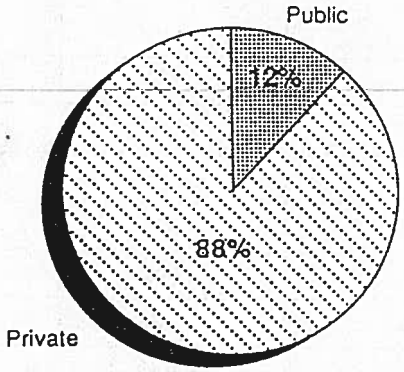
Newspapers



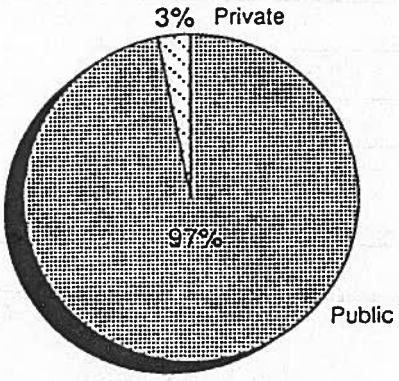
Corrugated Boxes



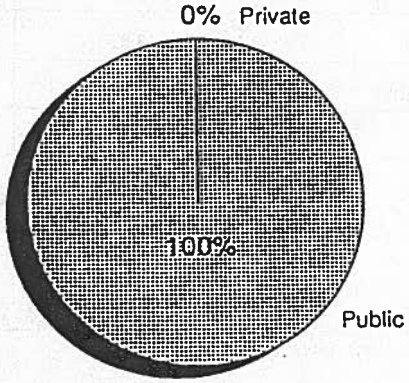
Glass



Ferrous Metals



Aluminum



Yardwaste

FIGURE 8

Distribution of Recycling
Activity by Sector and Material
Champaign County, 1988

Available Disposal Capacity

The closing of the Urbana landfill in November, 1988 significantly changed the ratio of waste disposed of in-county to that exported to neighboring counties. The Rantoul landfill is permitted, by ordinance, to accept waste only from a limited geographic area. The hauling pattern prior to the closing of the Urbana landfill showed approximately 68% of the total tonnage was disposed of in-county and the remaining 32% was exported to neighboring counties. With the closure of the Urbana landfill, these figures become 19% disposed on in-county and 81% disposed of out-of-county. Under the current solid waste laws, the unit of government granting the approval for development of expansion of a solid waste facility may impose restrictions or requirements as a condition of approval. These restrictions may include limiting the area where wastes accepted by the facility can originate. Private landfill operators may refuse to accept wastes from Champaign County at any time for any reason.

Continued reliance on out-of-county landfills is predicated on three factors:

(1) The available permitted disposal capacity at the receiving facility;

(2) The longevity of that capacity in light of increased yardage from Champaign County; and

(3) The consent or either the local government, as stipulated in the landfill's permit, or the owner of the landfill willingness to accept the waste.

The 1989 Available Disposable Capacity of Solid Waste in Illinois report, prepared by the Illinois EPA, indicated that 21 landfills in the East Central region (see Figure 9) reported a combined permitted disposal capacity of 35,194,958 cubic yards. Although there are 21 reporting landfills, only seven of them have **long-term** disposal capacity sufficient to handle the Champaign County municipal wastestream.

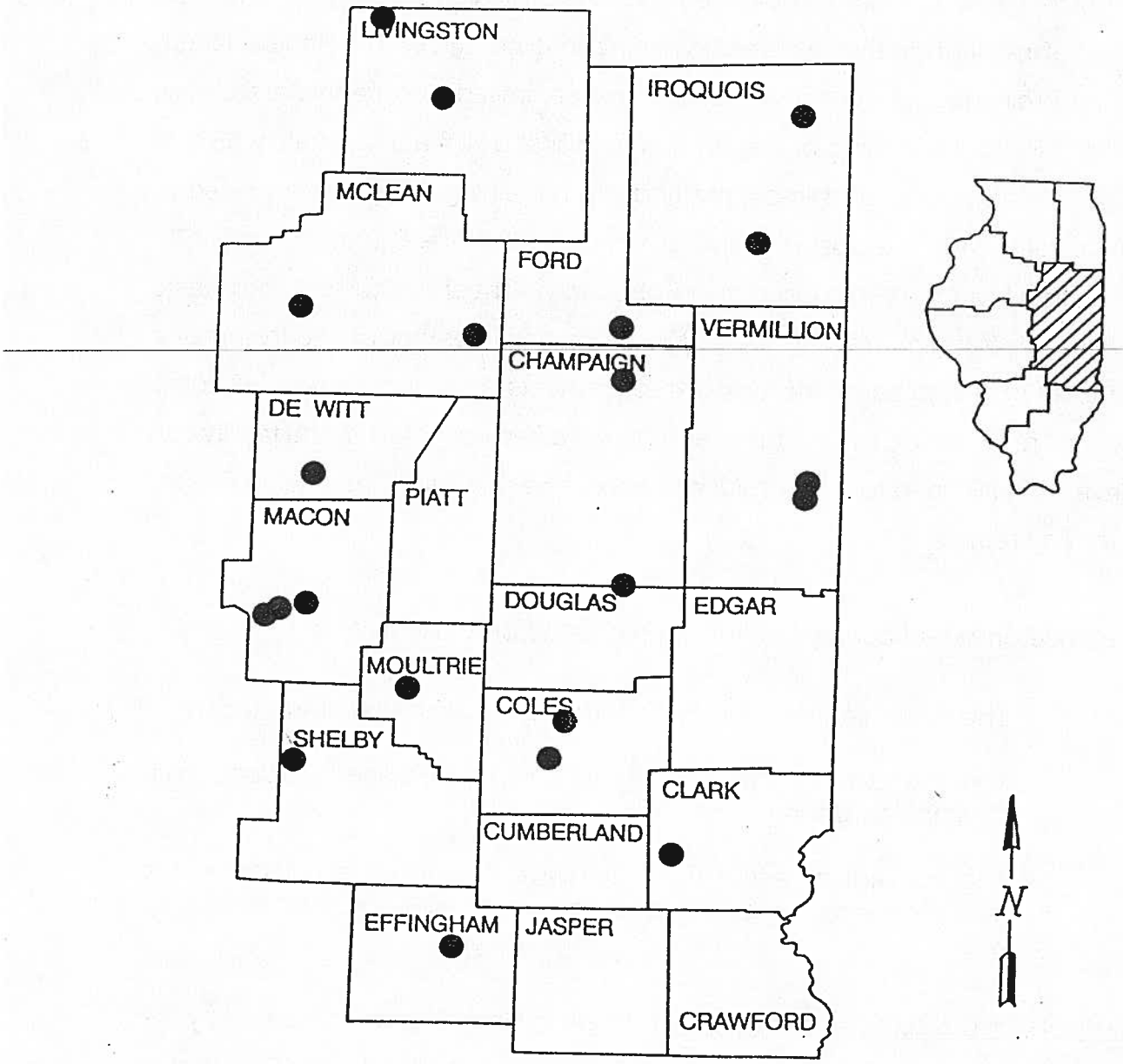


FIGURE 9

Landfills Accepting Municipal Solid Waste
in the East Central Region, 1989

A simple approximation of remaining available long-term capacity with regards to Champaign County's solid wastestream was determined, based on the following assumptions:

(1) Long-term capacity was defined as the ability to handle all of the County's exported municipal waste for four years or more based on reported permitted disposal capacity.

(2) The subject landfill would receive all of the County's municipal, construct-tion/demolition and industrial wastes. Treatment plant sludge was excluded.

(3) The current level or recycling and on-site disposal will continue at the present rate.

(4) The assumed total exported compacted volume for the Champaign County wastestream, based on generation rates, was approximately 303,795 cubic yards. This was based on an estimated landfill tonnage for construc-tion/demolition waste of 43,843 tons. The assumed density was 1,055 pounds per cubic yard, based on weigh program data (83,115 cubic yards). The estimated landfill tonnage for commercial, residential and industrial waste was 82,755 tons. The assumed compacted density was 750 pounds per cubic yard (220,680 cubic yards).

(5) Compacted gate yards for all waste delivered was assumed to be 750 pounds per cubic yard (2.66 cubic yards per ton). Compacted in-place landfill yardage was assumed to be 1,200 pounds per cubic yard (0.625 cubic yards per ton).

(6) Gate yards reported by landfill operators in the Illinois EPA available capacity report were converted to compacted gate yards and added to the anticipated amount of Champaign County solid waste that would be received. Adjustments were made to the Rantoul Municipal, Multi-County and H & L #2 landfills to reflect the fact that they receive portions of Champaign County's wastestream already.

(7) No attempt was made to redistribute wastes from other landfills throughout the region as the smaller landfills close over time and the wastes they receive must also be disposed of in remaining landfills with capacity.

(8) The region was closed; there was no regional importing or exporting of waste.

(9) No new capacity was assumed either through expansion of exiting landfills or development of new landfills.

Using these assumptions, long-term capacity was calculated. for example, if the Environmental Reclamation Company landfill were to accept all of Champaign County's waste plus its current gate yard, it would receive 491,271 gate yards in 1989 or 307,044 in-place cubic yards (gate yards compacted at 62.5%). The operator reported 2,673,000 cubic yards of remaining capacity. Thus, 2,673,000 cubic yards divided by 307,044 cubic yards equal 8.7 years. Consequently, the Environmental Reclamation Company landfill could handle all of the County's waste for 8.7 years. Table 19 shows the calculation of the other landfills in the East Central region.

Reviewing Table 19, the only landfills with long-term capabilities to accept Champaign County's waste are:

(1) Environmental Reclamation (Coles County) - 8.7 years
(2) Diebel (Effingham county) - 10.4 years
(3) Illinois Waste System (Iroquois County) - 9.5 years
(4) Kendall (Iroquois County) - 6.5 years
(5) Envirite (Livingston County) - 16.3 years
(6) McLean County (McLean County) - 13.5 years
(7) H & L #2 (Vermilion County) - 9.7 years

Figure 10 shows the location of these landfills.

TABLE 19

Available Long-Term Disposal Capacity:
*East Central Region, 1988-1989**

County Landfill Facilities	Reported Remaining Capacity (1988)[1]	Reported Gate Yards Received (1988)[2]	Reported Years Remaining (1988)[2]	Years Remaining Receiving All Champaign Co. Waste[3]
Champaign County				
Rantoul Municipal	500,000	92,841	5	2.6
Clark County				
Casey Municipal	103,000	13,069	6	0
Coles County				
Mattoon/Service Disposal #3	96,612	63,434	2	0
Environmental Reclamation	2,673,000	195,332	14	8.7
DeWitt County				
U-Dump-It	148,034	111,966	1	0
Douglas County				
Multi-County	978,171[4]	365,844	4	2.7[5]
Effingham County				
Diebel	2,627,190	98,796	31	10.4
Ford County				
Paxton Municipal	11,000	12,378	9	0
Iroquois County				
Illinois Waste System	3,191,656	233,083	20	9.5
Kendall	2,183,000	170,768	5	6.5
Livingston County				
Envirite Corp.	4,022,886	90,149	3	16.3
Streator	250,000	103,152	2	1

* Updated Table in Appendix 7.

TABLE 19 *CONT.*

Available Long-Term Disposal Capacity:
East Central Region, 1988-1989

County Landfill Facilities	Reported Remaining Capacity (1988)[1]	Reported Gate Yards Received (1988)[2]	Reported Years Remaining (1988)[2]	Years Remaining Receiving All Champaign County Waste[3]
Macon County				
Bath	130,459	12,542	12	0
Waste Hauling	813,000	216,928	3	2.4
Macon County	1,467,000	374,940	4	3.5
McLean County				
Bradd	37,854	30,217	1	0
McLean County	5,940,000	401,239	14	13.5
Moultrie County				
Loveall	150,000	43,362	2	0
Piatt County				
Monticello Municipal	254,488	5,512	10	0[6]
Shelby County				
Mentzler	27,170	1,560	18	0
Vermilion County				
H & L #2	5,479,701	747,098[7]	15	9.7
Thomas	482,324	55,866	8	2.1

(1) Expressed as in-place landfill yards.

(2) As reported by the IEPA in the Available Disposal Capacity For Solid Waste In Illinois: Third Annual Report. Gate yards and reported years of capacity remaining self-reported by operator.

(3) Total Champaign County compacted gate yards per year is approximately 306,228 cubic yards in 1989. Excludes material recycled or disposed of on-site.

(4) Value is for 1988. IEPA indicated a reporting error for self-reported data in 1989.

(5) Adjusted to account for waste already disposed of in Douglas County from Champaign County.

(6) Closed January 1, 1990.

(7) Adjusted to account for waste already disposed of in Vermilion County from Champaign County.

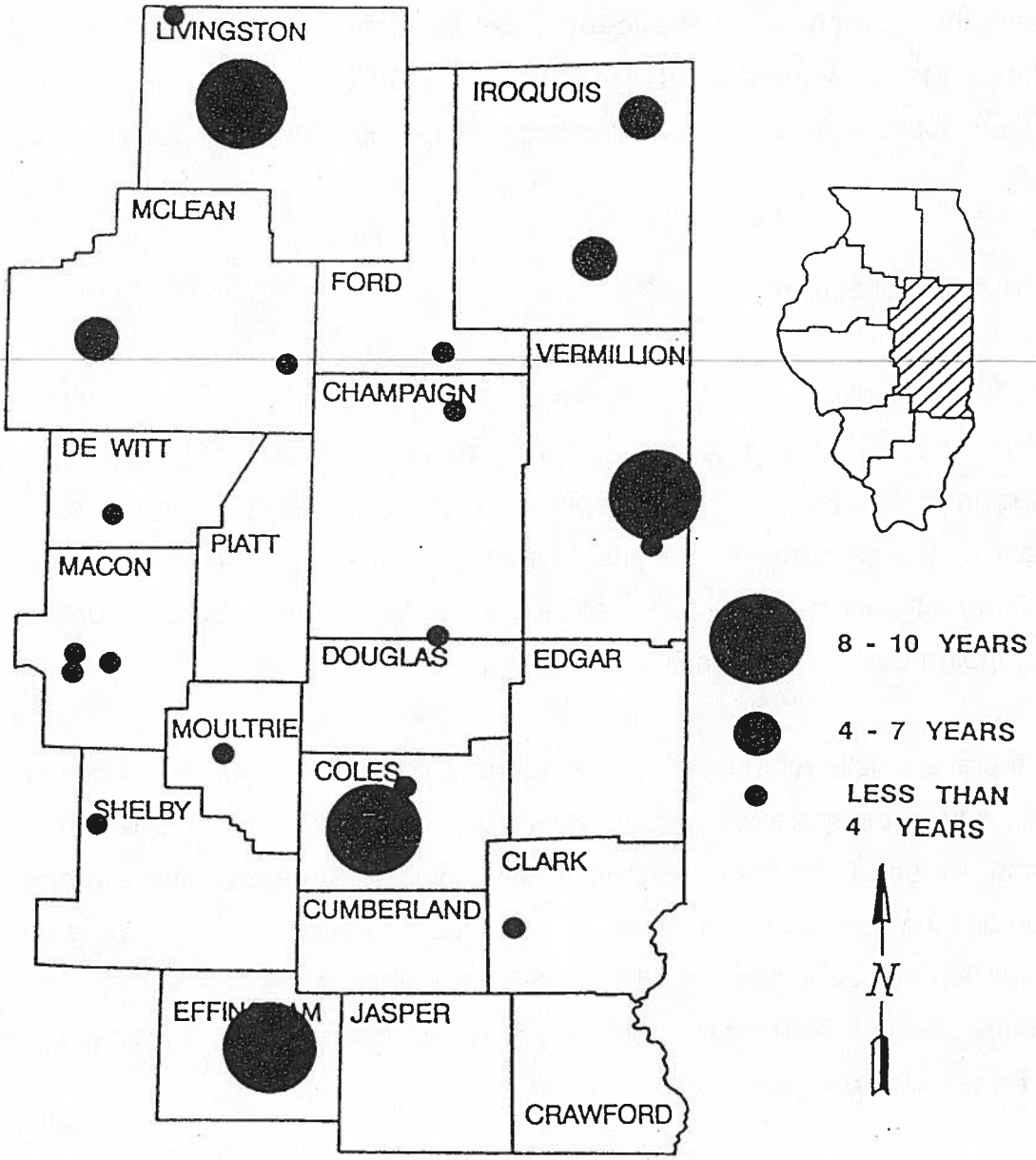


FIGURE 10

Landfills in the East Central Region with Available Long-Term Disposal Capacity,1989

All of the landfill years remaining my be over-estimated due to the reporting regulations. Some wastes, such as foundry sand, coal combustion waste, iron and steel slag, pollution control waste, and waste received under certain contract conditions are exempt from the reporting requirements. Since a landfill may be permitted to accept more than one type of waste, the actual gate yards **accepted** can be higher than the **reported** gate yards. Thus, it is possible for the landfills to reach capacity earlier than estimated. Consequently, there may be less long-term disposal capacity in the East Central region than these tables indicate.

Solid Waste Collection

The current collection system is operated entirely by the private sector except for the collection of recyclable materials. No franchising of routes has been attempted in Champaign or Urbana. In 1988, it appears that more than 40 independent collection companies operate in the County and all are free to operate in Champaign or Urbana or both. Some of these collection companies operate routes that extend through rural areas of Champaign County into other counties.

Since there are few restrictions in the County on where collection companies may operate, any or all operators may serve a given neighborhood. It is rare that a single company serves all the residences in a given block. Some operators report that the average distance between collections is 1,000 feet. In other words, there is an average of 5 collection companies serving the average city block in the Champaign-Urbana area. Since there are no standards for operating hours or service areas, most city streets have collection vehicles on them every work day.

For simplification, this discussion separates distance traveled during collection from distance traveled to the disposal facility. Estimating the travel distance is not straight forward. To estimate the distance hauled to disposal, the County was divided into wastesheds. These are shown in Figure 11. Each wasteshed had an identified

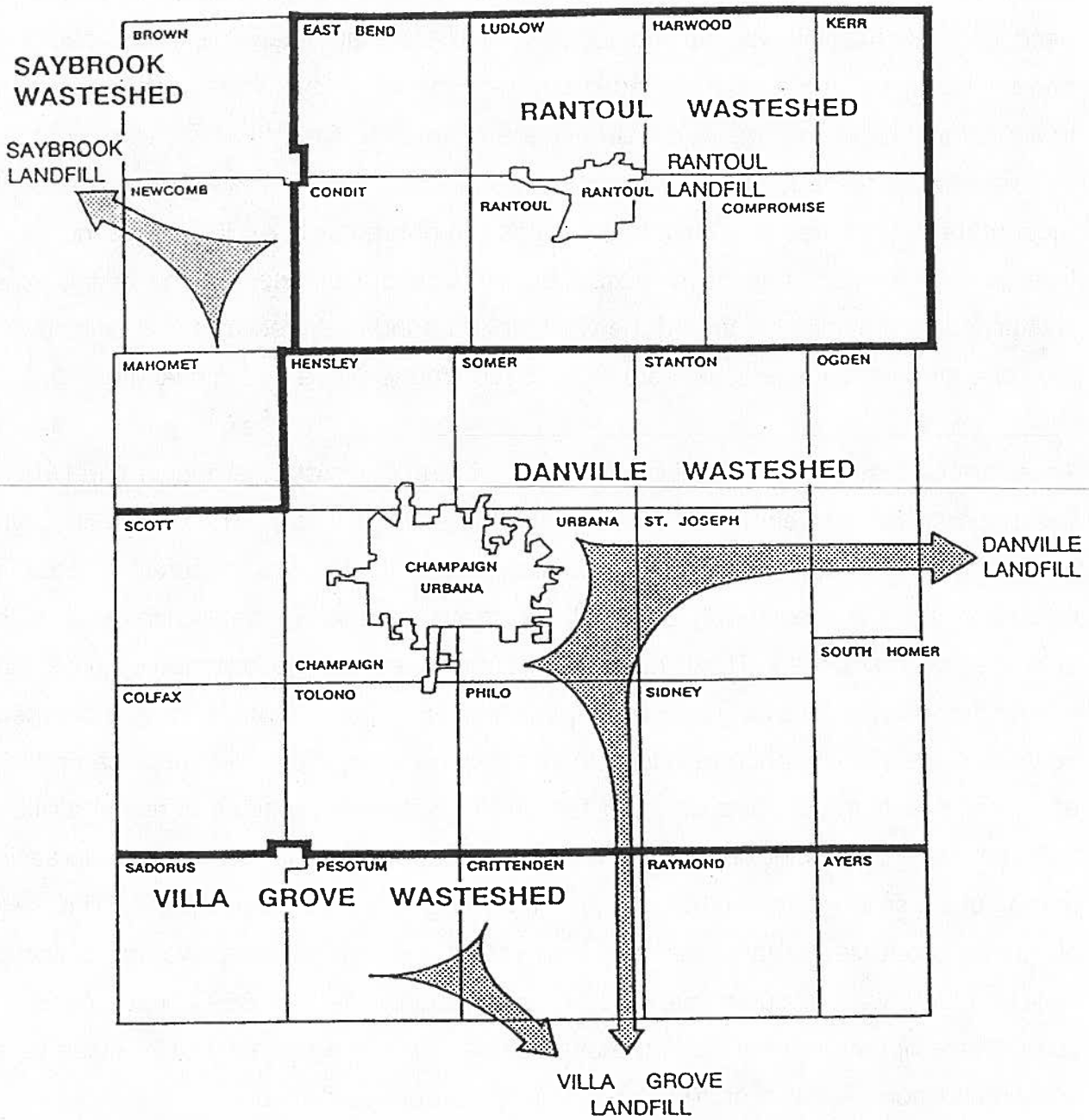


FIGURE 11

Estimated Wastesheds:
Champaign County

generation zone which was a municipality or a township. Assuming all of the waste from each generation zone was hauled to one landfill, average haul distances could be determined by measuring the distance from the centroid of each waste generation zone to its landfill. However, that is not always the case. The County was divided into five generalized wastesheds. Each wasteshed was identified by the landfill which accepts most of that area's waste. These wastesheds are not mutually exclusive. Some waste from one wasteshed may be disposed of in the landfill utilized by one of the other wastesheds. The lines identifying the wasteshed boundaries were not well defined and may change over time since haulers are not required to use a specific landfill.

There are no restrictions on collection vehicles in the Cities of Champaign and Urbana except gross vehicle weight restrictions set by the State of Illinois. The vehicle size, type and compaction capacity is entirely at the discretion of the individual operator. Since the closure of the Urbana landfill, both vehicle size and capacity have increased in the Champaign-Urbana area. This is due to the economic advantage imparted by large, high compaction vehicles in a long haul scenario. Gasoline, labor, maintenance and overhead costs increase with distance traveled. Increasing the amount of solid waste carried with each load offsets these costs on a per ton basis. Gate fees continue to rise at a rate of 20% per year in area landfills, but the fees are based on volume. Therefore, increasing density of the solid waste can help mitigate the rising fees on a per ton basis. The weigh programs conducted in late 1987 and early 1988, indicate that the average collection vehicle volume was 16 cubic yards with a compaction density of 650 pounds per cubic yard. Some operators now claim the average vehicle has a capacity of 20 cubic yards with compaction densities of 700 to 1,000 pounds per cubic yard.

An accurate count of the number and types of collection vehicles is not possible despite licensing requirements in both Cities. Both Cities list the license plate number and cubic yard capacity of each vehicle. However, there are gaps in the information and other potential inaccuracies that prohibit an accurate count. Since there are no restrictions on where collection company may do business, some vehicles are licensed in both Cities. Operators also report that their spare vehicles are licensed. Some operators have

reported that their fleets include 18 cubic yard, 20 cubic yard and 25 cubic yard compaction vehicles; 20 cubic yard and 30 cubic yard roll-off boxes. It is also known that there is one 30 cubic yard compaction vehicle and one top loading vehicle operating in the County. Construction/demolition waste, requiring landfilling, is typically hauled in roll-off boxes or in dump trucks. Some contractors have their own roll-off boxes while others hire waste collection companies of hauling.

Collection Characteristics and Costs

Just as there are no restriction on the size and type of vehicles local haulers may use, there are virtually no restrictions on the type of collection service they can offer. The only restriction on residential collection service occurs in Urbana. The restriction prohibits the placement of garbage cans or other containers at the curb. Therefore, all the haulers collecting in Urbana pick up containers from the back or side yards of the homes they service. Elsewhere in the County there is a wide range of service available to residential customers from local haulers. Customers can select once or twice a week pick-up; specify curbside or back door service (except in Urbana); rent containers (from some haulers). Most haulers do not limit the amount of garbage a customer can set out, no do they restrict the type of garbage they will take (the only restriction will be the State imposed ban on yardwaste).

ISWDA sponsored a county-wide household survey in November 1988. This survey, The Public on Solid Waste Disposal Issues: Champaign County Household Survey of November 1988 (see Part III, Appendix One for Executive Summary), included questions regarding the use of haulers. The questions asked included:

(1) *"Do you have a garbage hauler whom you pay to pick up and dispose of your trash?"*

(2) *"Do you set out your trash for the hauler (1) at the curbside, (2) in or by your house or garage, or (3) someplace else?"*

(3) *"Does you hauler pick up your trash once or twice a week?"*

(4) *"What is the name of your hauler?"*

(5) *"What is you monthly bill for this hauler?"*

Using this information, a profile of the average service level was developed. The information for each of the questions was also available by geographic area. Correlation and cross-referencing of data also allowed a market share distribution to be developed.

Respondents living in the Urban Fringe and Inner Ring (see Figure 12) were most likely to have a hauler with 81% responding yes to the question. In the Outer Ring, 74% of the respondents said yes, they have a hauler. The lowest number of people saying they used a hauler occurred in Champaign (64%), Urbana (61%) and Rantoul (59%). However, 94% of the respondents in Champaign-Urbana living in single-family homes have a hauler.

When asked where thy set their garbage, 56% of the respondents county-wide said thy sit it by or in their house or garage. About one-third (34%) said they set it at the curb and 10% of the respondents said they set it somewhere else. Somewhere else could mean a dumpster or along an alley. In Urbana, 78% of respondents said they placed their containers by their house or garage. However, 12% said they placed it at the curb. In Champaign, 48% of the respondents said they placed their containers at the curb while 41% said they leave it by their house or garage.

Throughout the County, 70% of the households had twice a week collection. Rantoul had the highest percent reporting twice a week service (98%) with Urbana and the Urban Fringe showing 74% of the homeowners with the same service. Champaign's respondents were only slightly less likely to have twice a week service (72%). The Inner Ring had 63% of the people saying they had twice a week service. Only the Outer Ring

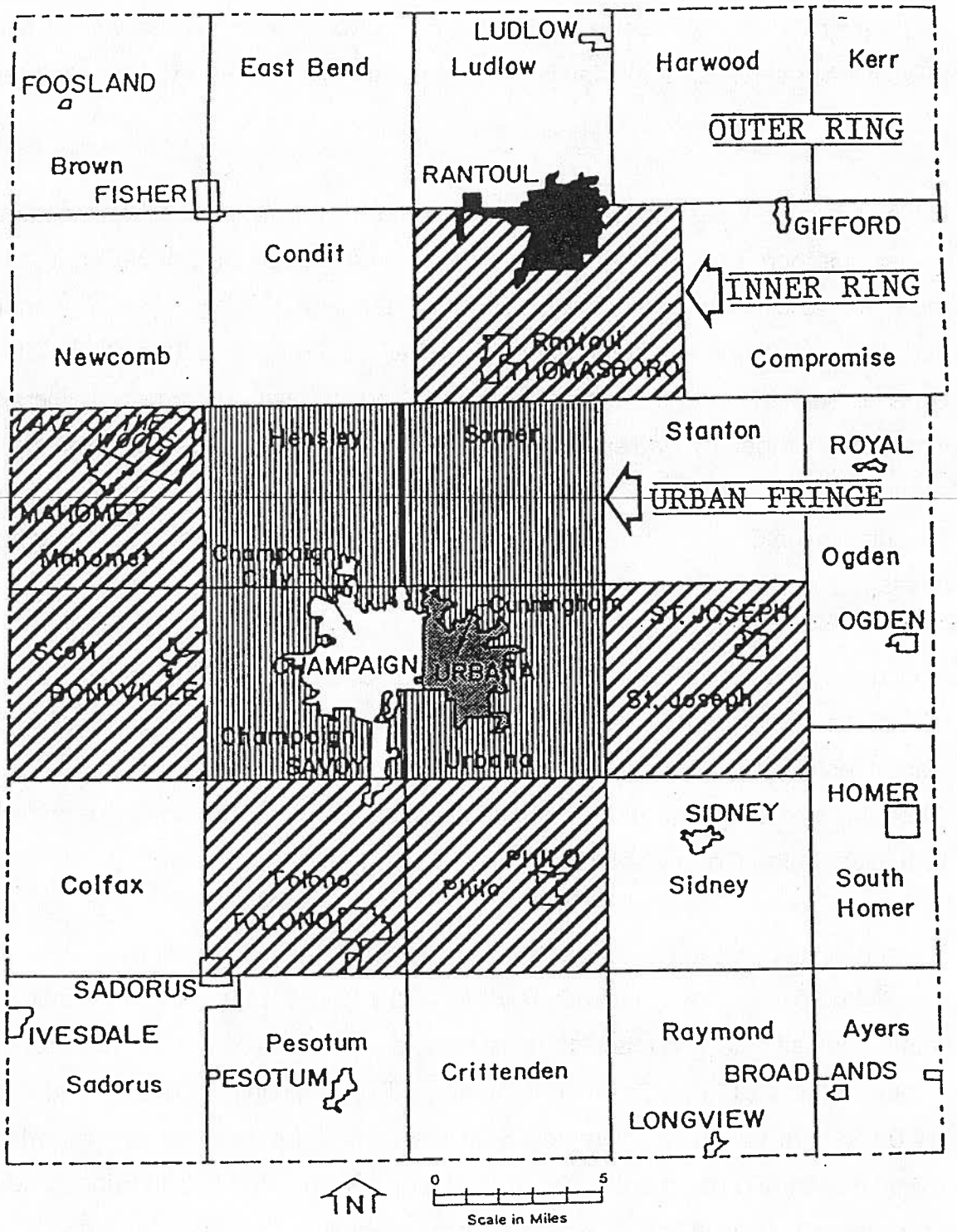


FIGURE 12

Reference Map of Champaign County:
For Use with Data from the 1988 Household Survey

had a majority of respondents (65%) reporting once a week service with 35% reporting twice a week service. Single family homes had the highest reported percentage of twice a week service (75%).

During this survey, respondents named 54 different haulers when asked the name of their hauler. Mergers and consolidations have lowered the number, however, it still appears there are 40 or more haulers operating in Champaign County. (See Appendix Six for detailed market share distribution.) Over half of the haulers operate in Champaign-Urbana. While residential customers in the County have 40 or more haulers to select from, the number of haulers servicing commercial and industrial accounts is much smaller. There are approximately 5 haulers servicing all the commercial and industrial accounts in the County. These services include dumpsters, roll-off boxes and compactor boxes.

After making adjustments in the data base for calculations, the largest hauler services 19% of the respondents county-wide. The next four largest haulers serviced 26% of the respondents. This means the top 5 haulers in the County service 45% of the population. When the next 5 largest haulers (which service 18%of respondents) are added, the top 10 haulers in the County service 63% of the residential population.

The survey also asked respondents what their monthly hauling bill was. The median bill was $11.00 per month; approximately half of the households paid more than$11.00 per month and half paid less than $11.00 per month. Most respondents (18%) reported their monthly bill was $12.00. The modal monthly bill reported in Champaign and Urbana was $12.00. There was a tie in Rantoul with the same number of people reporting paying $10.00 and $11.00 per month. The modal monthly bill in the Urban Fringe and the Inner Ring was $10.00 while $18.00 was the modal monthly bill in the Outer Ring. The average monthly bill paid to each hauler was also determined (See Appendix Six).

For a historical comparison, the results given above can be compared to those received in a similar survey of solid waste collection costs conducted in 1974. This survey was

conducted as part if the Champaign County Solid Waste Management Study prepared by Daily and Associates in December of 1974. In order to determine the percentage of people served by collection services in the small villages and their frequency, a survey was conducted of Village Clerks in 20 villages other than Rantoul in Champaign County. Replies were received from the following villages: Bondville, Broadlands, Ivesdale, Ogden, Pesotum, Sadorus, Savoy, Sidney, St. Joseph, and Tolono. The survey replies indicated that 85% to 99% of the residents in these villages received once or twice per week refuse removal service at a charge ranging from $2.50 to $5.00 per month. In addition, to ascertain the status of the collection system in rural and unincorporated areas, questionnaires were also sent to 28 township supervisors excluding Cunningham and the City of Champaign townships. Replies were received from Colfax, Hensley, Rantoul, St. Joseph, Scott, Urbana, Sidney, and Somer Townships. The survey replies indicated complete private collection of rural subdivisions and about 50% collection of other rural areas. Collection in the subdivisions near Champaign and Urbana was similar to the service provided for City residents. The frequency of service varied with the individual haulers throughout the County. Service on a call basis at $1.00 a pick-up was indicated as available in some areas, but some type of scheduled service (twice per month, once per week, or twice per week) was available at $3.00 to $5.00 per month.

APPENDIX ONE

1988 Weigh Program Summary

WEIGHING PROGRAM SUMMARY

1 INTRODUCTION

The purpose of this weighing program was to develop density factors which can be applied to volume data to help characterize the waste stream. It would have been desirable to weigh in each of the four seasons; however, budget and time constraints restricted weighing to two seasons.

The first one-week weighing program of this project was conducted the week of November 16, 1987 and the second was the week of January 11, 1988. All waste entering the Urbana landfill during the two weeks was weighed on rented temporary axle scales placed on a concrete slab just inside the entrance gate. As each load was weighed, it was categorized by observation and driver interview using the following classifications:

Type of waste (residential, commercial, etc.)
Origin of waste (city, University of Illinois, rural, etc.)
Vehicle type (packer, dump truck, etc.)
Hauler type (private, city, etc.)

(The gatekeeper normally classifies waste only as loose, packed, or brush.) The landfill gate is normally open from 7:00 a.m. to 3:20 p.m. Monday through Friday and 7:00 a.m. to 11:20 a.m. on Saturday.

Because of an electrical problem with the scale on Monday morning, November 16, the November weighing week ran from Monday noon November 16 through Monday noon, November 23. This week was selected as a typical fall week, with no holidays and with school in session. During the January weigh week, the University was not in session. In the November week weather conditions ranged from rain and mild temperatures early in the week to cold (teens) by Saturday. The January week was cold and windy, with temperatures ranging from 0°F to 30°F. The following sections summarize the preliminary

results of the two one-week weighing periods. The weighing program was conducted by Franklin Associates, Ltd. (FAL) and the ISWDA staff, with assistance from the landfill gatekeeper.

2 WASTE QUANTITY

In the November weighing week, 789 loads of solid waste weighing 2,601 tons were delivered to the landfill. In January 626 loads totaling 1,995 tons were weighed. A daily summary of the data is shown in Table D-1 and Figure D-1. The 2,601 tons equates to 372 tons per day and 1,995 tons equals 285 tons per day on a 7 days per week basis. The highest daily volume each week was received on Monday; however, the weight peaked on Tuesday. The November average daily density of waste ranged from 543 pounds per cubic yard on Saturday to 902 on Tuesday, with an avearage of 720 compared to a range of 483 to 656 and average 562 pounds per cubic yard in January. The November density is considerably higher than expected for typical municipal solid waste (MSW) and as discussed later in this report, is thought to result from the unusually large quantities of demolition waste received.

3 WASTE TYPE

The gatekeeper at the landfill categorizes all incoming waste as being loose waste, packed waste, or brush. The brush category includes all brush, leaves, grass clippings, and wooden pallets. These items are not landfilled, but are either composted or set aside for reuse. The user fee for all waste except brush is $4.20 per cubic yard. The charge for brush is $1.00 per cubic yard. An additional $2.10 per cubic yard is charged for hard to handle items, such as tires, furniture, large chunks of demolition material, etc. The gatekeeper is responsible for estimating all solid waste volumes. All estimates in this study involving volumes use the regular gatekeeper's estimates.

Table 1

WASTE QUANTITIES RECEIVED AT URBANA LANDFILL
WEEK OF NOVEMBER 16, 1987

	No. of Vehicles	Weight (tons)	Volume (cubic yards)	Pounds per Cubic Yard
Monday	158	547	1,626	673
Tuesday	154	659	1,461	902
Wednesday	143	504	1,336	754
Thursday	125	373	975	765
Friday	135	356	1,238	575
Saturday	74	161	593	543
Total	789	2,601	7,229	720

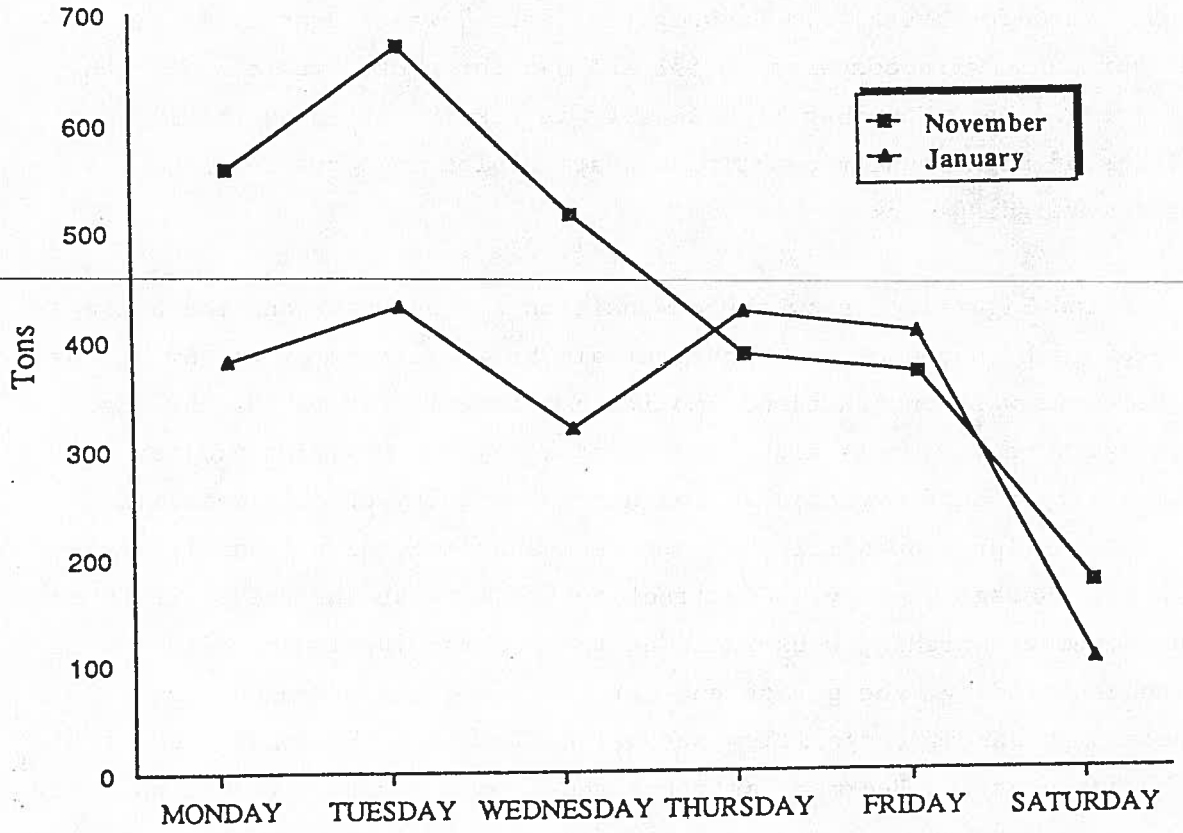
WEEK OF JANUARY 11, 1988

	No. of Vehicles	Weight (tons)	Volume (cubic yards)	Pounds per Cubic Yard
Monday	118	371	1,396	532
Tuesday	113	419	1,344	624
Wednesday	108	308	1,276	483
Thursday	122	412	1,255	656
Friday	122	394	1,506	523
Saturday	43	90	319	565
Total	626	1,995	7,097	562

Source: Franklin Associates, Ltd.

Figure 1

WEIGHT OF WASTE RECEIVED AT THE URBANA LANDFILL DURING THE NOVEMBER 1987 AND JANUARY 1988 WEIGHING WEEKS



During the weighing weeks, the weights of all loads of waste were recorded. Tare weights were measured only once each month for each truck. A summary of the weigh data for each of the three kinds of waste is shown in Table 2 and Figure 2. The so-called "loose" waste in November has the highest density, 938 pounds per cubic yard compared to 604 pounds per cubic yard for packed waste and 462 pounds per cubic yard for brush. In January the "loose" waste density is 586 pounds per cubic yard compared to 558 and 345 for packed waste and brush, respectively. This November high density is likely caused by the large quantities of high density demolition waste hauled in nonpacker trucks during the weighing week.

Table 3 and Figure 3 show the composition of the waste and the average density of each component. In November almost 47 percent by weight of the waste received was construction/demolition material. It is thought that this category is unusually high because of a major demolition project at the University's Huff gymnasium. The highest density of this material, which contains large quantities of concrete and dirt, significantly affects the overall average density. Construction projects at the University during the November weighing week included the Beckman Institute, Microelectronics Building, the garage and car pool, and the greenhouse and headhouse. In January, special waste was hauled from the demolition of eight houses near the Beckman Institute and from a downtown Champaign fire.

About 18 percent of the total waste (460 tons) in the November week consisted of residential waste and 20 percent (530 tons) was commercial waste. This compares to 21 percent residential waste and 31 percent commercial waste in January. Four loads, identified as industrial waste were received during the two weeks. Yard waste constituted just under 13 percent in November and dropped to less than 4 percent in January. "Other" waste consists of special loads of material that are not easily categorized and includes such items as furniture, tires, dirt, and "household junk."

Table 2

SUMMARY OF WEIGHING RESULTS BY WASTE DESCRIPTION

	No. of Loads		Weight (tons)		Volume (cubic yards)		Density lb/cu yd	
	Nov	Jan	Nov	Jan	Nov	Jan	Nov	Jan
"Loose" waste	408	357	1,453	1,120	3,099	3,819	938	586
Packed waste	200	197	823	811	2,724	2,907	604	558
Brush	181	72	352	64	1,406	371	462	346
Totals	789	626	2,601	1,995	7,229	7,097		
Average							720	562

Source: Franklin Associates, Ltd.

4 ORIGIN OF WASTE RECEIVED

The origin of each load of waste received at the Urbana landfill was tabulated according to the following categories:

- Champaign
- Urbana
- University of Illinois
- Rural Champaign County (outside city limits of Champaign and Urbana)
- Outside of Champaign County.

The results are shown in Table 4. As these data show, nearly all the waste received (98 percent in November and 96 percent in January) came from within the city limits of Champaign and Urbana. The high percentage of waste from the University (34 percent by weight in November) may be atypical, reflecting the demolition projects on the campus. These demolition projects also help explain the high density (828 pounds per cubic

Figure 1

DENSITY OF WASTE RECEIVED AT THE URBANA LANFILL, BY WASTE DESCRIPTION

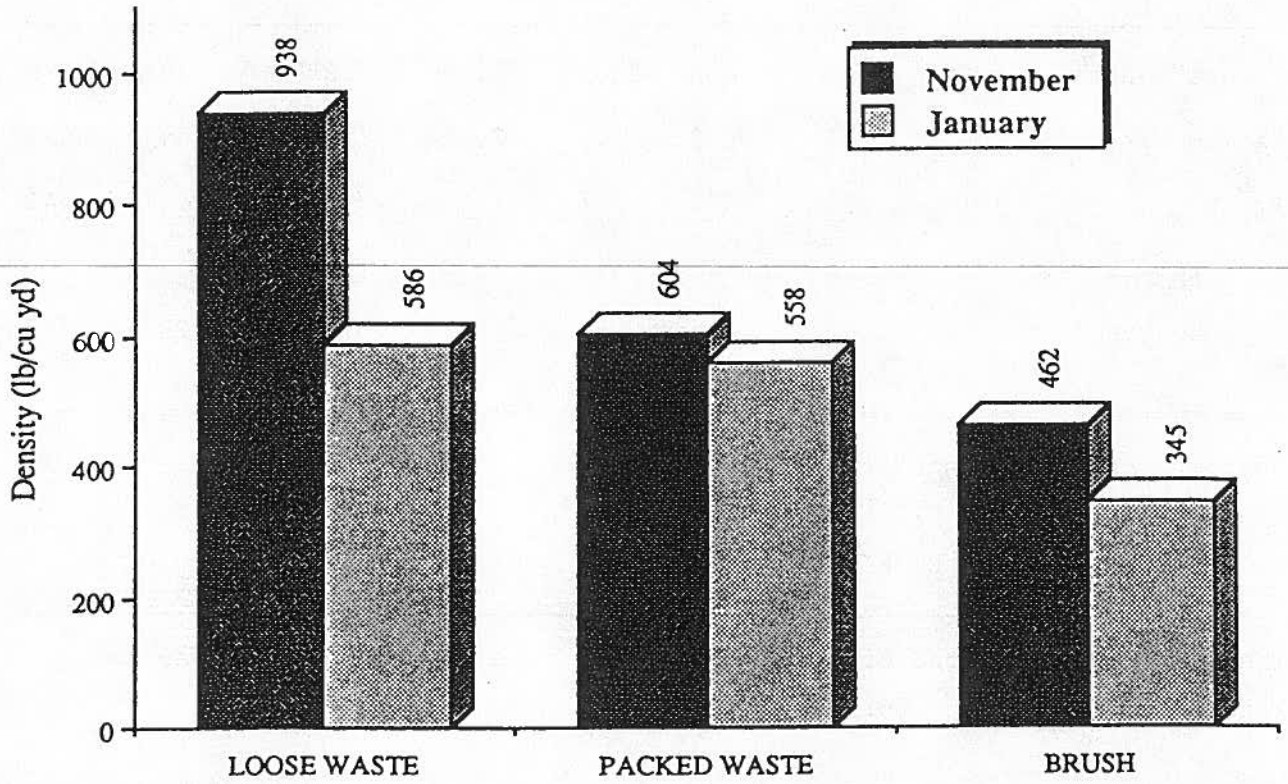


Table 3

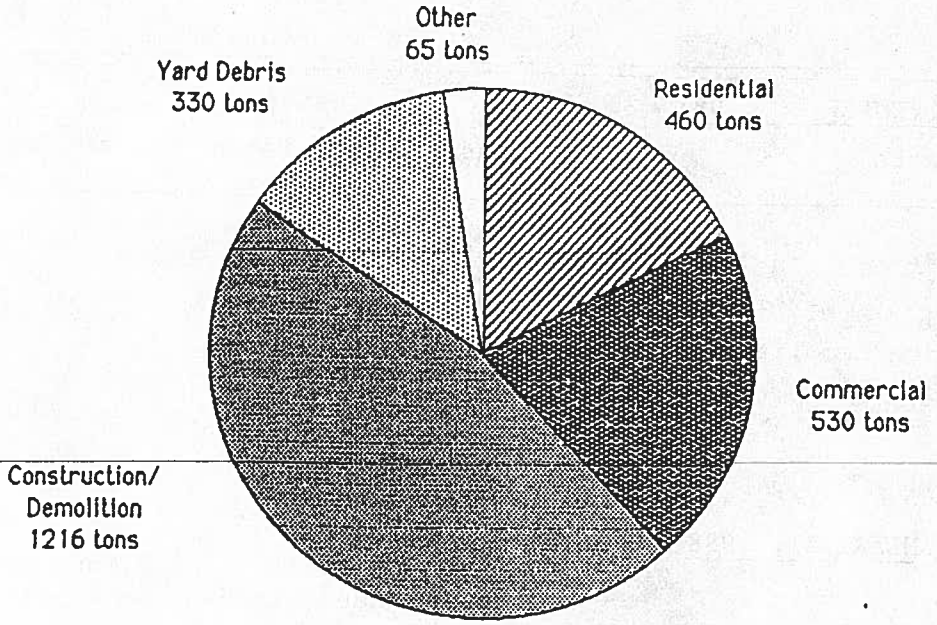
COMPOSITION AND DENSITY OF WASTE RECEIVED AT THE URBANA LANDFILL

WEEK OF NOVEMBER 16, 1987 Type of Waste	Tons	Cubic Yards	Pounds per Cubic Yard	Tons per Day (a)
Residential	460	1,813	507	66
Commercial	530	1,976	536	76
Industrial	0	0	NA	0
Construction/Demolition	1,216	1,788	1,360	174
Yard	330	1,436	459	47
Other	65	216	602	9
Totals	2,601	7,229	720	372

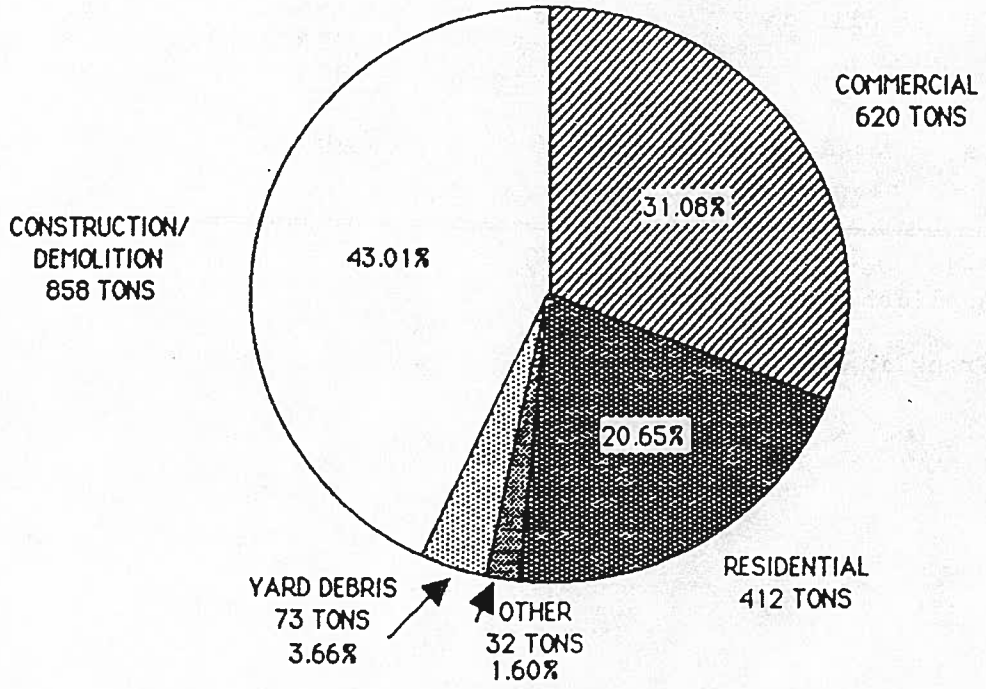
WEEK OF JANUARY 11, 1988 Type of Waste	Tons	Cubic Yards	Pounds per Cubic Yard	Tons per Day (a)
Residential	412	1,628	506	59
Commercial	620	2,625	472	89
Industrial	4	30	241	<1
Construction/Demolition	857	2,286	751	122
Yard	73	413	355	10
Other	28	115	494	4
Totals	1,995	7,097	562	285

(a) On a 7-day per week basis.
NA = Not Applicable

Source: Franklin Associates, Ltd.



(a) November 1987



(b) January 1988

Figure 3. Composition of waste received at the Urbana landfill.

Table 4

ORIGIN OF SOLID WASTE DELIVERED TO THE URBANA LANDFILL

WEEK OF NOVEMBER 16

Location	Tons	Cubic Yards	Pounds per Cubic Yard	Tons per Day (a)
Champaign	842	2,718	619	120
Urbana	830	2,232	744	119
University of Illinois	877	2,118	828	125
Rural Champaign County (outside city limits)	52	157	657	7
Outside Champaign County	<1	3	440	<1
Totals	2,601	7,229	720	372

WEEK OF JANUARY 11, 1988

Location	Tons	Cubic Yards	Pounds per Cubic Yard	Tons per Day (a)
Champaign	835	2,870	582	119
Urbana	510	1,799	567	73
University of Illinois	577	2,182	529	83
Rural Champaign County (outside city limits)	64	217	586	9
Outside Champaign County	9	29	652	1
Totals	1,995	7,097	562	285

Source: Franklin Associates, Ltd.

yard) of University of Illinois waste in November. In January, however, even with school not in session, the University still supplies 29 percent of the waste to the landfill. A further analysis of the University waste shows that in both November and January, 79 percent of the University waste was classified as construction/demolition waste. In November the University generated 69 tons of residential waste and 103 tons of commercial (one week) and in January, without the students, there were 15.5 tons of residential and 93 tons of commercial waste.

5 VEHICLE TYPE

The weight, volume, and density of waste as a function of vehicle type are shown in Table 5. Twelve types of vehicles, ranging from semi-trucks to automobiles, delivered waste during the two weeks. In November, forty-three percent of the waste by weight (1,123 tons) was delivered by dump truck and 32 percent by packer truck. Significant quantities were also brought in by open-top roll-offs (299 tons), flat bed trucks (152 tons), and compaction roll-offs (66 tons). In January, only 24 percent was delivered by dump truck, while packer truck was relatively unchanged at 31 percent.

Waste density versus type of vehicle for the week in November ranged from 1,334 pounds per cubic yard for a semi-truck load of demolition material to 174 pounds per cubic yard for waste delivered by automobile. In January the range was 977 to 242. The one cubic yard minimum per vehicle probably keeps the automobile and pickup waste density artificially low.

6 TYPE OF HAULER

The final classification of this study was by hauler type. The various hauler types considered were:

- Private citizen
- Private commercial
- Private industry

Table 5

TYPE OF VEHICLES USING URBANA LANDFILL

WEEK OF NOVEMBER 16, 1987 Type of Vehicle	No. of Loads	Tons	Cubic Yards	Pounds per Cubic Yard
Rear/Front Loader	185	825	2,718	607
Open-Top Roll-Off	62	299	1,046	572
Compaction Roll-Off	16	66	409	321
Dump Truck	282	1,123	1,913	1,174
Van	6	3	17	341
Flat Bed Truck	67	152	407	745
Pickup	84	32	225	281
Automobile	7	0.7	8	174
Vehicle with Trailer	18	16	77	417
Drop Box	31	36	215	331
Side Loader	30	36	174	417
Semi-Truck	1	13	20	1,334
Totals	789	2,601	7,229	Average 720

WEEK OF JANUARY 11, 1988 Type of Vehicle	No. of Loads	Tons	Cubic Yards	Pounds per Cubic Yard
Rear/Front Loader	136	615	1,974	624
Open-Top Roll-Off	97	310	1,909	325
Compaction Roll-Off	32	162	805	402
Dump Truck	130	477	976	977
Van	7	4	19	432
Flat Bed Truck	96	128	543	472
Pickup	43	13	111	242
Automobile	3	2	9	340
Vehicle with Trailer	10	5	27	365
Drop Box	14	25	75	674
Side Loader	36	46	210	434
Semi-Truck	22	208	440	946
Totals	626	1,995	7,097	Average 562

Totals may not add due to rounding.

Source: Franklin Associates, Ltd.

- Contractor
- State vehicle
- Federal vehicle
- County vehicle
- City/village vehicle
- Utility company vehicle
- University vehicle
- Private licensed hauler
- Other

As shown in Table 6, the largest amount of waste hauled to the landfill by a single source was by University vehicles (873 tons out of 2,601 tons). Private licensed haulers delivered 736 tons to the landfill during the November weighing period. Contractors delivered 428 tons, private commercial haulers delivered 267 tons, and city/village vehicles delivered 230 tons during the November week. One load in November was delivered to the landfill by private industry, however, the data sheets show this load to be yard waste. Therefore, no process waste was received at the landfill during the November weighing period.

The largest amount of waste delivered by a single source in January was by private licensed haulers (844 tons out of 1,995 tons). University vehicles delivered 600 tons to the landfill during the January weighing period. Contractors brought 356 tons, private commercial 43 tons, city/village vehicles 40 tons, private citizens and other sources 26 tons and 84 tons, respectively during the January weighing. Four loads identified as industrial wastes, were delivered to the landfill during the January week.

Table 3

WEIGHT, VOLUME, AND DENSITY OF URBANA LANDFILL WASTE BY HAULER TYPE

WEEK OF NOVEMBER 16, 1987

Hauler Type	No. of Loads	Weight (tons)	Volume (cubic yards)	Density (pounds per cubic yards)
Private Citizen	56	25	136	365
Private Licensed Haulers	191	736	2,582	570
Private Commercial	162	267	912	585
Private Industry	1	1	5	472
Contractor	125	428	803	1,066
State Vehicle	1	3	6	957
Federal Vehicle	0	0	0	NA
County Vehicle	0	0	0	NA
City/Village Vehicle	76	230	581	791
Utility Company	0	0	0	NA
University	170	873	2,120	824
Other	7	38	84	911
Totals	789	2,601	7,299 Average	720

WEEK OF JANUARY 11, 1988

Hauler Type	No. of Loads	Weight (tons)	Volume (cubic yards)	Density (pounds per cubic yards)
Private Citizen	49	26	143	367
Private Licensed Haulers	212	844.3	3,092	546
Private Commercial	51	42.9	219	393
Private Industry	0	0	0	NA
Contractor	84	356	815	872
State Vehicle	0	0	0	NA
Federal Vehicle	1	0.5	3	360
County Vehicle	2	1.3	14	184
City/Village Vehicle	43	40	223	362
Utility Company	0	0	0	NA
University	155	600	2,240	536
Other	12	84	348	480
Totals	625	1,995	7,097	562

NA = Not Applicable.

Source: Franklin Associates, Ltd., week of November 16, 1987.

APPENDIX TWO

Calculation of Old Newspaper Generation

CALCULATION OF OLD NEWSPAPER GENERATION

1 METHODOLOGY

References used to estimate the amount of old newspaper generation were Circulation '87/'88[1], and Editor & Publisher 1987 International Year Book[2]. The data from these sources are current for 1986.

Daily newspapers distributed within Champaign County were identified from Circulation. Circulation of the newspapers and their annual newsprint consumption were determined using Editor & Publisher. Consumption data for the Chicago Sun-Times and Champaign-Urbana News-Gazette were not available. These data were estimated by averaging the consumption of other newspapers with similar circulation.

Since the Champaign-Urbana News-Gazette is by far the dominant newspaper circulated within the County, a check of the reliability of the above estimate was performed. The paper's circulation and consumption were available for 1983 from Editor & Publisher 1984 International Year Book[3]. Using these data, the percent change in circulation from 1983 to 1986 was determined:

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[1] American Newspaper Markets, Inc., Circulation '87/'88, Northfield, Illinois.

[2] The Editor & Publisher Co., Inc., Editor & Publisher 1987 International Year Book. New York, New York.

[3] The Editor & Publisher Co., Inc., Editor & Publisher 1984 International Year Book. New York, New York.

1983 circulation	17,710,212
1986 circulation	16,394,092
Difference:	1,316,120
% Change:	-7.43

Since the drop in circulation from 1983 to 1986 was 7.43 percent, 1983 consumption of newsprint was also reduced the same percent:

1983 consumption	5,100 short tons
Minus 7.43%	-379
1986 consumption	4,721 short tons

This method indicates 1986 consumption of newsprint to be 4,721 short tons, which is exactly the amount of consumption determined by averaging consumption of newspapers with similar circulation. Therefore, we feel the estimate is reliable.

Consumption for the Wall Street Journal was based on data from the Newsprint Information Committee[4] adjusted to 1986 circulation data. These data allow for the calculation of newsprint consumption per unit of circulation as shown in Table 1.

Referring again to Circulation, the daily circulation of each newspaper within the County was recorded and multiplied by the number of days of distribution annually and then multiplied by the newsprint consumption per unit of circulation. (Daily circulations of USA Today and the Wall Street Journal within the County were assumed to be proportional to their circulation per population for the country as a whole.) This provided the annual newsprint generation for the County for daily newspapers circulated as shown in the column labeled "Unadjusted" in Table 2.

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[4] Newsprint Information Committee, Newspaper and Newsprint Facts at a Glance, 1984-85, New York, New York.

Table 1

CHAMPAIGN COUNTY, ILLINOIS
AVERAGE WEIGHTS OF NEWSPAPERS CIRCULATED

Newspaper	Weekly Circulation (a) Mon-Fri	Saturday	Sunday	Annual Newsprint Consumption (a) (tons/year)	Total Weekly Circulation	Newsprint Consumption per Circulation (b) (pounds/unit)
Bloomington Pantagraph	53,623	53,623	56,582	5,000	378,320	0.51
Champaign-Urbana News-Gazette	44,179	44,273	50,103	4,721 (c)	315,271	0.58
Chicago Sun-Times	612,686	420,501	625,935	150,910 (c)	4,109,866	1.41
Chicago Tribune	744,969	608,317	1,112,200	225,910	5,445,362	1.60
University of Illinois Daily Illini	11,500	0	0	374 (d)	57,500	0.25 (d)
USA Today	1,179,052	0	0	165,300	5,895,260	1.08
Wall Street Journal	1,952,283	0	0	185,271 (e)	9,761,415	0.73

(a) Editor & Publisher 1987 International Year Book unless otherwise noted. (Converted to short tons if given in metric tons.)

(b) Calculated: (Newsprint consumption x 2,000)/[(Mon-Fri circulation x 260) + (Saturday x 52) + (Sunday x 52)].

(c) Estimated based on consumption of other newspapers with similar circulation.

(d) Consumption per Circulation determined by weighing average issue. Annual newsprint consumption is calculated: [(Mon-Fri circulation x 260) x consumption per circulation]/2,000.

(e) Based on data from Newsprint Information Committee.

Table . 2

CHAMPAIGN COUNTY, ILLINOIS
NEWSPRINT GENERATED
(In short tons)

County/Newspaper (a)	Weekly Circulation per County (a) Daily	Weekly Circulation per County (a) Sunday	Newsprint Consumption per Circulation (b) (pounds/issue)	ONP Generation Within County (tons/year) Unadjusted (c)	ONP Generation Within County (tons/year) Adjusted (d)	Total ONP Generation (e) (tons/year)
CHAMPAIGN						
Bloomington Pantagraph	229	260	0.51	22	24	
Champaign-Urbana News-Gazette	34,552	38,119	0.58	3,701	4,145	
Chicago Sun-Times	640	702	1.41	167	186	
Chicago Tribune	3,679	4,390	1.60	1,101	1,233	
University of Illinois Daily Illini (f)	11,500	0	0.25	374	419	
USA Today (f)	236	0	1.08	33	33	
Wall Street Journal (f)	390	0	0.73	37	37	
County Total	51,226	43,471		5,434	6,078	7,064

(a) Circulation '87/'88.

(b) From Table A-1.

(c) Calculated: [(Daily circulation x 312) + (Sunday circulation x 52)] x (Consumption per circulation)/2,000. For newspapers published Monday-Friday, 260 was used in the first term.

(d) A factor of 1.12 was used to adjust for comics, inserts, ink, etc. Note: USA Today and Wall Street Journal are assumed to have no inserts.

(e) A factor of 1.30 was applied to the unadjusted tonnage to account for all uses of newsprint other than daily newspapers.

(f) Published Monday-Friday.

It should be noted that this information establishes the amount of newsprint printed by daily newspapers, and that it excludes advertising inserts, comics, and Sunday magazines that are part of most newspapers.

Over the last decade newsprint consumption by daily newspapers has declined to about 75 percent of total newsprint consumption. The remainder is printed mostly by large commercial printers that produce commercial advertising, advertising inserts, comics, Sunday magazines, and television or other inserts. In addition small publishers produce other newspapers such as weeklies, religious, "shoppers," school papers, and smaller community newspapers. There are also business publications and other uses of newsprint.

To develop an estimate of the total tonnage of ONP generated in the County, we made two adjustments to the newsprint consumption estimates described above and shown in the "Unadjusted" column of Table 2. The conservative adjustment is based on using a 1.12 factor to account for advertising inserts, comics, Sunday magazines, and ink. This can be considered the total tonnage associated with daily newspapers distributed in the County. This is the value shown in the "Adjusted" column of Table 2.

Finally, the total estimated ONP was calculated using an average ratio of total newsprint shipments to daily newspaper consumption of newsprint[5]. This produced an adjustment factor of 1.30. When this ratio is applied to the consumption of newsprint by daily newspapers (the "Unadjusted" column) the total estimated tonnage is calculated and displayed in the column labeled "Total ONP Generation" in Table 2. This accounts for all uses of newsprint.

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[5] American Paper Institute, Newsprint Division, Newsprint Shipments by Destination, 1986.

APPENDIX THREE

Calculation of Old Corrugated Container Generation

CALCULATION OF OLD CORRUGATED CONTAINER GENERATION

The generation of old corrugated containers (OCC) in a county can be estimated by taking into account several interacting factors, such as box plant consumption, manufacturing efficiencies, end-use of box plant output, and the specific geographic economic activity. Franklin Associates, Ltd. has developed a methodology which assesses the differential effects of each of these factors upon OCC generation on an individual county basis.

1 METHODOLOGY OF CALCULATING OCC GENERATION

1.1 Box Plant Consumption

The 1986 box plant consumption and relative consumption by industry was obtained from the "Fibre Box Industry 1986 Annual Report"[1]. Census Bureau employment figures were available only as recently as 1984; however, employment patterns are assumed to remain essentially unchanged. Actual corrugated container production was estimated by reducing the total box plant consumption of corrugated by 10 percent to allow for trim, cuttings, and other scrap generated in the box plant. Such trimmings and cuttings are generally returned for recycling in paperboard mills and do not appear as finished corrugated container output from the box plants. The 10 percent trim and cutting loss estimation has been updated from previous estimates used in a study for the paper industry[2] with the assumption that box plant efficiency has improved slightly with technological advances. The actual trim loss may be lower or higher depending upon the style of box being made and varying efficiencies of individual box plants.

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[1] Fibre Box Association, "Fibre Box Industry 1986 Annual Report."

[2] Franklin Associates, Ltd., "Waste Paper: The Future of a Resource, 1980-2000," Solid Waste Council of the Paper Industry, 1982.

1.2 End-Use Determination of Box Plant Output

The first step in determining the distribution of discarded containers is to classify national box plant output into end-use categories. The classification of box plant output into wholesale, retail, or manufacturing end-uses was derived from the Shipments by End-Use Industry as reported in the "Fibre Box Industry 1986 Annual Report." The consumption by industry was reported as a percent of the national total box plant consumption. These industrial categories were designated into 14 groups based on Standard Industrial Classification (SIC) codes. In the FAL methodology, these groups represent the point at which corrugated containers are actually discarded and become OCC. These groups and the corresponding shipment categories are shown in Table 1. The employees working in the industries listed in the right-hand column ship products to the economic sectors on the left-hand side, the point at which corrugated containers are discarded.

1.3 County Group Profile and OCC Generation

To estimate the amount of OCC generated by the County, the number of local employees in each group is stated as a percentage of the national total of employees within the respective group[3]. By stating the number of local employees as a percentage of the national total, the amount of OCC generated by the local employee groups can be determined as a percent of the national end-use totals for each group.

Therefore, the ratio of local to national employees per group times the ratios of corrugated assigned to each group will give the local amount of old corrugated container generation.

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[3] U.S. Bureau of the Census, County Business Patterns, 1985, "Illinois." CBP-85-15.

Table 1

SIC GROUPS AND CORRESPONDING FIBER BOX INDUSTRY CONTAINER SHIPMENTS, 1986

SIC	Group	SIC	Receive Corrugated From	% of National Total
57	Furniture and Home Furnishings	227	Floor-covering Mills	0.1
502	Furniture and Home Furnishings (wholesale)	25	Furniture and Fixtures	1.5
		251	Household Furniture	1.4
		363	Household Appliances	1.6
		365	Radio and TV Receiving Sets	0.3
				4.9
501	Motor Vehicles and Automotive Equipment	29	Petroleum Refining	0.7
		37	Transportation Equipment	0.2
55	Automotive Dealers and Service Stations	371	Motor Vehicles and Equipment (1/3)	0.4
				1.3
~~3711~~	~~Motor Vehicles and Car Dealers~~	~~371~~	~~Motor Vehicles and Equipment (2/3)~~	~~0.7~~
27	Printing and Publishing	26	Paper and Allied Products (1/4)	3.75
511	Paper and Paper Products			
52	Building Materials and Garden Supplies	24	Lumber and Wood Products	1.0
503	Lumber and Construction Materials	285	Paints and Varnishes	0.3
507	Hardware, Plumbing, and Heating Equipment	295	Paving and Roofing Materials	0.0
		32	Stone, Clay, and Glass Products (2/3)	0.7
				2.0
504	Sporting Goods, Toys, and Hobbies	27	Printing, Publishing, and Allied Industries	1.2
512	Drugs, Proprietaries, Goods, and Sundries	283	Drugs	0.6
		273	Books	0.3
53	General Merchandise Stores	30	Misc. Plastic Products	6.6
59	Miscellaneous Retail	31	Leather and Leather Products (1/2)	0.2
		32	Stone, Clay, and Glass Products (1/3)	0.3
		322	Glass and Glassware (1/4)	1.7
		326	Pottery and Related Products	0.2
		39	Misc. Manufacturing Including Toys	4.8
				15.9
514	Groceries and Related Products	20	Food and Kindred Products	36.6
		21	Tobacco Manufacturers	0.6
54	Food Stores	26	Paper and Allied Products (3/4)	11.3
		284	Soap, Detergents, Cleaning Preparations	2.8
		322	Glass and Glassware (3/4)	4.9
		341	Metal Cans	0.3
				56.5
23	Apparel and Other Textile Products	22	Textile Mill Products	2.6

Table 1 (continued)

SIC	Group	SIC	Receive Corrugated From	% of National Total
516	Chemicals and Allied Products	28	Chemicals and Allied Products	1.5
		282	Plastics Materials and Synthetic Resins	1.1
				2.6
508	Machinery, Equipment, and Supplies	35	Machinery Including Service Machinery	1.5
		38	Professional and Scientific Instruments	0.7
		329	Abrasive, Asbestos, and Miscellaneous	0.3
				2.5
5051	Metals Service Centers and Offices	33	Primary Metals Industries	0.5
		34	Fabricated Metal Products	2.6
				3.1
506	Electrical Goods	36	Electrical Machinery, Equipment, and Supplies	1.1
		364	Electric Lighting and Wiring	0.7
		366-36	Communications Equipment and Electronic Components	0.3
				2.1
56	Apparel and Accessory Stores	23	Apparel and Other Finished Products	1.6
513	Apparel, Piece Goods, and Notions	31	Leather and Leather Products (1/2)	0.2
				1.8
42	Trucking and Warehousing	42	Motor Freight and Warehousing	0.4

Source: Franklin Associates, Ltd., based on "Fibre Box Industry 1986 Annual Report."

The following formula was used to calculate OCC generation for each group:

(1986 box plant consumption) - (% box plant trim loss)
x (% of box plant output discarded by SIC group)
x (% of U.S. employee group employees) = OCC generation.

A flow chart illustrating containerboard shipments to the point of local OCC generation is shown in Figure 1.

The generation of OCC per local end-use group for Champaign County is shown in Table 2. The OCC generation estimated for Champaign County is slightly higher than the national average calculated on a per capita basis. The national average is 157.5 pounds per person in 1986[4]. The average OCC generation in Champaign County is 163.9 pounds per person in 1986.*

* Based on population for Champaign County as of July 1986, U.S. Bureau of the Census, and total OCC generation from Table B-2.

4 Calculated based on figures in the American Paper Institute's 1987 Statistics of Paper, Paperboard and Wood Pulp.

Figure 1
FLOW OF CONTAINERBOARD MANUFACTURE TO LOCAL OCC GENERATION

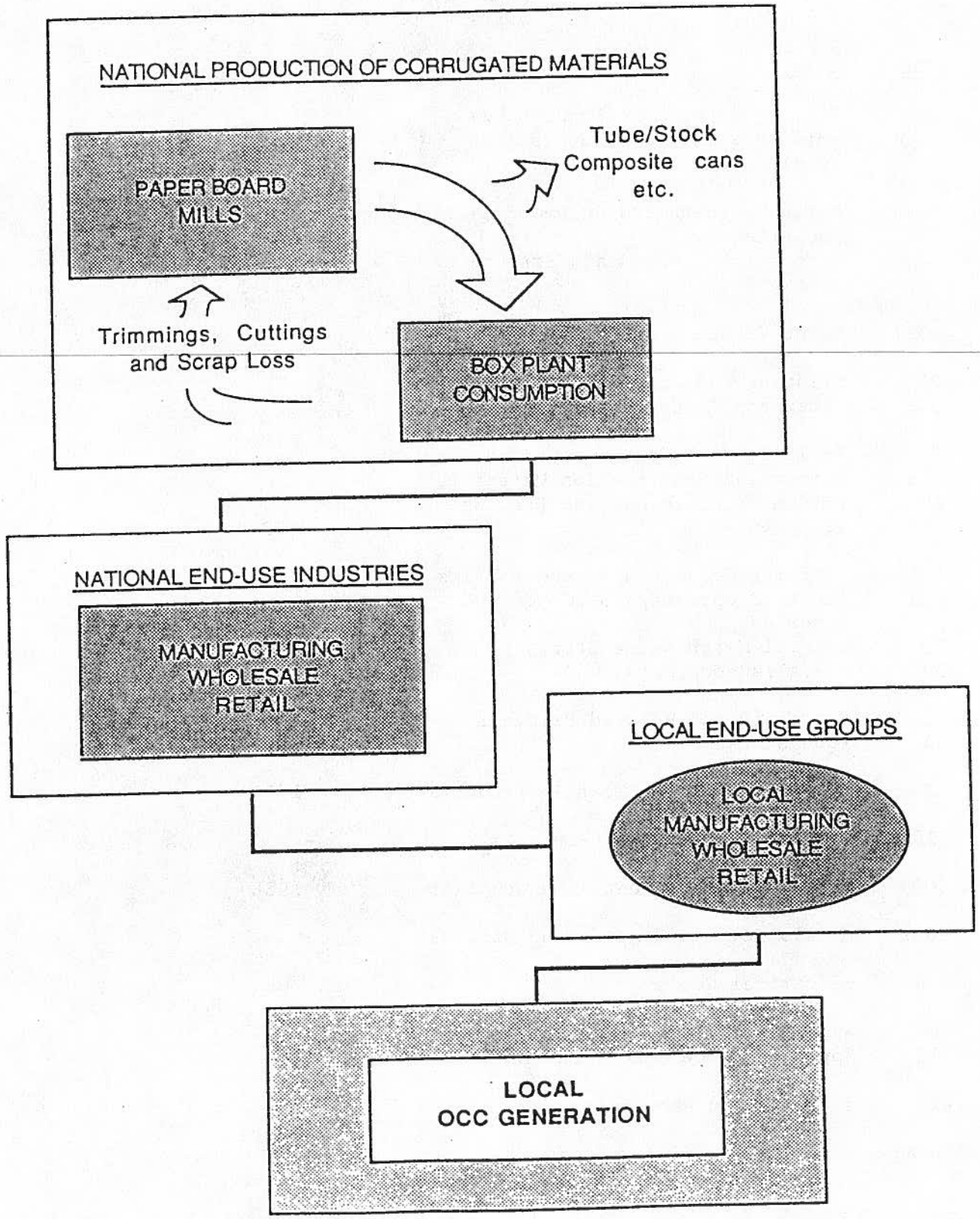

Table 2

GENERATION OF OLD CORRUGATED CONTAINERS, 1986
(In short tons)

SIC	Group	Champaign County
57	Furniture and Home Furnishings	
502	Furniture and Home Furnishings (wholesale)	484
501	Motor Vehicles and Automotive Equipment	
55	Automotive Dealers and Service Stations	155
3711	Motor Vehicles and Car Dealers	-
27	Printing and Publishing	
511	Paper and Paper Products	500
52	Building Materials and Garden Supplies	
503	Lumber and Construction Materials	
507	Hardware, Plumbing, and Heating Equipment	23
504	Sporting Goods, Toys, and Hobbies	
512	Drugs, Proprietaries, Goods and Sundries	
53	General Merchandise Stores	
59	Miscellaneous Retail	2,798
514	Groceries and Related Products	
54	Food Stores	9,357
23	Apparel and Other Textile Products	155
516	Chemicals and Allied Products	-
508	Machinery, Equipment, and Supplies	198
5051	Metals Service Centers and Offices	-
506	Electrical Goods	68
56	Apparel and Accessory Stores	
513	Apparel, Piece Goods, and Notions	247
42	Trucking and Warehousing	31
Total		14,016

Source: Franklin Associates, Ltd.

APPENDIX FOUR

Calculation of Office Paper Generation

CALCULATION OF OFFICE PAPER GENERATION

The major factors that determine the quantity of office paper discards are the number of office workers and the nature of the business conducted in the region of interest. Franklin Associates, Ltd. has developed a methodology to calculate office paper consumption per employee based on the number of office employees in selected industries and estimates of the amount of office paper generated per type of employee. The calculations and assumptions made to derive office paper generation are discussed below.

1 METHODOLOGY OF CALCULATING OFFICE PAPER GENERATION

1.1 Local Office Worker Profiles

The number of office workers in private industry for Champaign County was obtained from County Business Patterns[1]. The most recent figures available for Illinois were 1984 data. Office workers were divided into two categories: employees in bank/insurance buildings and employees in general office buildings. The latter category includes local and federal government office workers as well as other private office employees. Data for government office employees were obtained from The Biennial Report of Employment by Geographic Area, December 31, 1986 for county/federal employment figures and Local Government Employment in Major County Areas: 1985 for county/local government figures. The number of office workers at the University of Illinois was obtained by calling the University. These data were aggregated for the two categories. The results are summarized in Table 1.

1.2 Office Paper Generation per Employee

Previously, Franklin Associates, Ltd. has estimated office paper generation in a county by determining the number of office employees in certain SICs[1],

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[1] U.S. Bureau of the Census, County Business Patterns, 1985, "Illinois," CBP-85-15.

Table 1

OFFICE WORKER PROFILES AND OFFICE PAPER GENERATION

BANKING/INSURANCE WORKERS[a]		Employees	Generation (tons/year)
SIC			
60	Banking	1,174	
61	Credit Agencies	333	
62	Security, Commodity Brokers, and Services	103	
64	Insurance Agents, Brokers, and Services	274	
67	Holding and Other Investment Offices	77	
Total Employees		1,961	641
GENERAL OFFICE WORKERS[a]			
SIC			
731	Advertising	91	
732	Credit Reporting and Collection	-	
733	Mailing, Reproduction, and Stenographic	92	
736	Personnel Supply Services	214	
737	Computer and Data Processing Services	146	
7391	Research and Development Labs	150	
7392	Management and Public Relations	109	
81	Legal Services	408	
82	Educational Services	127	
86	Membership Organizations	1,241	
893	Accounting, Auditing, and Bookkeeping	228	
Federal Office Workers[b]			
	Department of Agriculture	168	
	Department of Education	-	
	Department of HHS	30	
	Department of Treasury	25	
	Department of Interior	64	

Table 1 (continued)

Federal Office Workers[b] (continued)	Employees	Generation (tons/year)
Department of Justice	-	
Department of Commerce	1	
Environmental Protection Agency	-	
Army	290	
Navy	3	
Air Force	1,112	
Local Government Workers[c]	5,330	
University of Illinois Office Workers	8,875	
Total Employees	18,704	2,282
Total Office Paper Generation:		
Banking/Insurance	641	
General Office	2,282	
Total		2,923 tons/year

(a) U.S. Bureau of the Census, County Business Patterns, "Illinois."

(b) U.S. Office of Personnel, Federal Civilian Employment: The Biennial Report of Employment by Geographic Area, December 31, 1986.

(c) U.S. Bureau of the Census, Local Government Employment in Major County Areas: 1985.

then multiplying by a generation factor for each employee. The generation factors shown below are taken from an EPA study[2].

Bank/insurance workers	0.327 tons/employee/year
General office workers	0.122 tons/employee/year
Composite*	0.202 tons/employee/year

There is a general perception that more office paper is being generated each year. This is true, but a calculation of national office paper generation per employee did not show an increase. Therefore, we have continued to use the same values for generation of office papers on a per employee basis. The composite number above (0.202 tons per employee per year) agrees very well with the findings of a recent FAL study for an eastern urban county (0.21 tons per employee per year).

2 OFFICE PAPER DISCARDS IN CHAMPAIGN COUNTY

The data for office paper discards per employee can be determined by multiplying the number of employees in bank/insurance buildings by the generation rate of 0.327 tons per employee per year and the number of employees in general office buildings by 0.122. The result is 2,923 tons per year of office paper.

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* Weighted based on numbers of office employees in 1976.

2 SCS Engineers, "Optimization of Office Paper Recovery Systems," U.S. Environmental Protection Agency (SW-135c), 1977.

APPENDIX FIVE

Small Quantity Hazardous Waste Generation

SURVEY METHODOLOGY AND STATUS

National Comparisons

The volume of hazardous waste attributed to SQGs originates from a variety of businesses producing characteristic waste. As of September 1986, SQGs are regulated by the EPA. Most hazardous waste from SQGs is not manifested, despite existing regulation and variances, and as a result of waste oil/solvent route service, and improper disposal. In 1985, in an attempt to assess the types and quantities of hazardous waste generated by small quantity generators, the U.S. EPA conducted a nationwide survey that identified 23 industrial groups as potential hazardous waste generators (Table 1). The survey determined by industry an average waste generation factor for broad waste categories, excluding waste oil. Waste oil is not regulated as a hazardous waste under RCRA, but must be manifested under the Illinois Special Waste Laws.

While some businesses identified by the EPA survey may not generate any hazardous waste, this is balanced by generators that generate far larger quantities than predicted by the survey. To determine the number of related businesses in Champaign County, as recognized by the survey, the 1984 County Business Patterns (U.S. Bureau of Consensus) was used. Small quantity generators constitute those businesses identified in Table 1 and have less than 250 employees. Since these figures reflect the number of businesses in 1984, a 3% annual growth factor was used to scale the 1984 data to the base year 1986. The number of businesses obtained for the Champaign County region are listed in Table 1.

A total of 844 businesses in Champaign County are potential small quantity generators. The largest industry group is Vehicle Maintenance, with 342 businesses that are possible hazardous waste generators. The only other triple-digit number of businesses is Construction with about 211 establishments. There are approximately 58 commercial printing establishments in the region.

INDUSTRIAL GROUPS POTENTIALLY CONTAINING SMALL QUANTITY GENERATORS

Group No.	Industrial Group	SICs Included	Est. Number of SQG's in Champaign County
1	Pesticide End Users	7992, 8421	7
2	Pesticide Application Services	0711, 0721, 0729, 0782, 0783, 4949, 7342	32
3	Chemical Manufacturing	2819, 2820, 2861, 2869	2
4	Wood Preserving	2491	0
5	Formulators	2834, 2851, 2978, 2893, 2899	1
6	Laundries	7216, 7217, 7218	17
7	Other Services	7260, 7349	18
8	Photography	7332, 7333, 7395, 8411	15
9	Textile Manufacturing	2230, 2250, 2260, 2270	0
10	Vehicle Maintenance	0722, 1600, 1794, 4210, 4469, 5270, 5500, 7512, 7513, 7519, 7530	342
11	Equipment Repair	4610, 4800, 5962, 7620, 7630, 7694, 7996	24
12	Metal Manufacturing	2514, 2522, 2542, 3350, 3390, 3400, 3470, 3500, 3600, 3692, 3714, 3800, 3910, 3961, 3964, 3993, 3995	36
13	Construction	1711, 1721, 1743, 1752, 1761, 1793, 2452, 4000	211
14	Motor Freight	4231	0
15	Furniture/Wood Manufacturing and Refinishing	2434, 2435, 2436, 2492, 2511	1
16	Heavy Metal Users	0724, 3211	0
17	Printing/Ceramics	2640, 2650, 2700, 3251, 3253, 3260, 7312	58
18	Cleaning Agents/Domestic Manufacturing	2841 through 2844	0
19	Other Manufacturing	3079, 3100, 3291, 3293	8
20	Paper Industry	2611, 2621, 2631, 2661	0
21	Analytic and Clinical Laboratories	7391, 7397, 8062, 8069, 8071 8072, 8220, 8922	31
22	Educational and Vocational Shops	8211, 8249, 8331	0
23	Wholesale and Retail Sales	5160, 5191, 5198, 5230, 5310	36

Champaign County Survey

Characteristic Information from Local Survey

The characteristic nature of Champaign County's SQGs cannot be determined from the national EPA survey alone. To better understand the magnitude and habits of local small quantity generators, an in-depth survey was conducted addressing the hazardous waste characteristics of three significant industrial sectors within the County. These industrial sectors include (1) vehicle maintenance; (2) dry cleaners; and (3) photofinishing laboratories. These business types were selected because they furnish a good cross-section of hazardous waste types commonly generated by Small Quantity Generators.

The survey design involved initiating telephone contacts with randomly selected businesses within each group and arranging for a telephone interview with a representative of the firm being surveyed. Persons performing the interview were trained to be familiar with the basic operations and the types of hazardous waste used in each business category.

The primary objective of the local survey was to identify hazardous waste types and quantities generated through daily business operations. Businesses were also asked about the storage and eventual disposal of these wastes. To better develop management strategies for small quantity generators, business were questioned about their perceptions and opinions on regulations, emergency response and education. Following is a discussion of the results revealed by this local survey.

The local survey, conducted with the three types of small quantity generators listed above (30 businesses), revealed characteristic behavior of the small quantity generator. Two-thirds of the businesses interviewed were not familiar with the U.S. EPA's Small Quantity Generator of Hazardous Waste Regulations. Seven establishments had a U.S. EPA Identification Number, with only three of these ever using an Illinois Uniform Hazardous Waste Manifest form. Three businesses were familiar with the Illinois Hazardous Waste Research and Information Center's Industrial and Technical Assistance Program. Only one business had heard of the Small Quantity Generator's Manual available from both the Illinois Hazardous Waste Research and Information Center and the U.S. EPA.

Disposal of hazardous waste was consistent within industrial groups. The majority of vehicle maintenance shops participated in periodic pickups of their waste oil, solvents and waste batteries. Such practices do not require manifesting quantities. Of the photo labs interviewed, all five businesses dispose of their hazardous waste, typically silver sludge and other solutions, into the sewer. Dry cleaners typically reported that their waste gets picked up by recycling/leasing operations.

Vehicle Maintenance

1986 Number of Businesses: 217
Number Interviewed: 19 (9%)
SIC Code: 5511 (Auto Dealers), 5541 (Gasoline Stations), 7538 (Auto Repair)

Vehicle maintenance, by virtue of the volume of services provided, accounts for the largest business sector among all small quantity generators. In 1986, an estimated 217 gas stations, auto repair shops and auto dealers operated in the Champaign/Urbana area, each possibly generating a variety of hazardous waste ranging from waste oil to used car batteries. In addition to these businesses, additional company-operated vehicle centers for privately-owned buses, trucks and automobiles exist.

The local survey conducted within the Champaign/Urbana area was directed toward gas stations, auto repair shops and auto dealers. In all, 19 businesses were interviewed, and each industry reported similar types of waste (Table 2).

The most significant waste reported was waste oil, identified by 18 shops interviewed. The quantity reported varied greatly among specific industries, ranging from monthly quantities of 15 to 1,400 gallons. The single generator of 1,400 gallons per month was a business that exclusively performs quick oil changes. As an average, the vehicle maintenance industry generates approximately 175 gallons of used oil every month.

Waste solvents was the second most reported waste, identified by 12 businesses at an average monthly rate of 23 gallons. Used vehicle batteries were generated from 9 businesses, averaging 11 batteries per month. Other hazardous waste reported included antifreeze, used paint, degreasers, carburetor cleaner and asbestos dust.

Table 2

GENERATION OF HAZARDOUS WASTE BY THE
VEHICLE MAINTENANCE INDUSTRY IN CHAMPAIGN COUNTY

Type of Waste	Process or Waste Stream	No. of Shops Reporting Waste†	Monthly vol. per business (average)	Storage Method (% total generators)	Disposal Method (% total generators)
Waste Oil	Oil changing	18	18 - 1400 (175) gal.	Fixed tank, underground 50% Fixed tank, aboveground 11% Steel drums 28% Not stored 6% Plastic barrels 6%	Recycle off-site 94% Incinerated on-site 6%
Solvents	Parts cleaning	12	2 - 50 (23) gal.	Steel drums 73% Fixed tank, underground 18% Plastic containers 9%	Recylced off-site 100%
Used Batteries	Battery replacement	9	1 - 45 (11) ea.	Shelved 100%	Recycle off-site 100%
Antifreeze	Antifreeze changing	4	10 - 50 (25) gal.	Not stored 25% Steel drums 25% Fixed tank, aboveground 25% Plastic containers 25%	Recycle off-site 50% Sewer 50%
Asbestos Dust	Brake pad replacement	3	0.25 gal.	Not stored 100%	Sewer 33% Community trash 33% Unknown 33%
Carburetor Cleaner	Carburetor cleaning and vacuum check	3	5 - 6 (5.5) gal.	Steel drums 67% Fixed tank, aboveground 33%	Recycled off-site 100%
Degreaser	Parts cleaning	1	7 gal.	Fixed tank, aboveground	Recycle off-site
Used Oil Cans	Oil changing	1	55 ea.	Not stored	Community trash
Aersol Cans	Product containers	1	14 ea.	Not stored	Community trash

† Total number of shops interviewed in Campaign County = 19.

Waste oil and solvents traditionally have high levels of collection and off-site recycling by commercial recycling companies. All generators of waste solvents reported that their solvent gets picked-up for recycling. Seventeen of the 18 waste oil generators indicated that the used oil is handled similarly; the single generator who did not practice this disposal method indicated that he disposes of the waste oil in an on-site incinerator. Half of the generators of anti-freeze dispose of the waste into the sewer. Other less significant quantities were identified as being placed into community trash bins.

Dry Cleaning

1986 Number of Businesses: 17
Number Interviewed: 4 (24%)
SIC Code: 7212, 7215, 7216

Dry cleaning establishments include coin-operated dry cleaners, dry cleaning (except rug cleaning) and carpet/upholstered cleaning. Perchloroethylene, or "perc," is the primary solvent used in dry cleaning operations and Stoddard solvent, a petroleum distillate, is used in most other operations. Solvents are generally recycled in the cleaning process by evaporation and condensation. However, solvents not directly reused are typically collected and processed by commercial recycling companies.

In the Champaign County area all 4 dry cleaners contacted reported generating some form of hazardous waste (Table 3). Perchloroethylene residues were identified by 3 shops at an average monthly rate of 14 gallons. A single firm reported spent filters as its only hazardous waste.

The majority of hazardous waste generated by dry cleaners was stored in drums, barrels or plastic containers, and eventually picked up by a commercial recycling company. However, one business indicated that "perc" residues generated there are not stored, and are disposed of with nonhazardous trash.

Table 3

GENERATION OF HAZARDOUS WASTE BY THE
DRY CLEANING INDUSTRY IN CHAMPAIGN COUNTY

Type of Waste	Process or Waste Stream	No. of Shops Reporting Waste†	Monthly vol. per business (average)	Storage Method (% total generators)	Disposal Method (% total generators)
Perchloroethylene ("Perc") Residues	Dry cleaning solvent	3	5 - 30 (14) gal.	Steel drums 33% Barrels 33% Contained in filter 33%	Transport service to off-site treatment 67% Community trash 33%
Spent Filters	Dry cleaning machinery	2	2 splits	Steel drums 50% Barrels 50%	Transport service to off-site treatment 100%

† Total number of shops interviewed in Campaign County = 4.

Photofinishing Laboratories

1986 Number of Businesses: 15
Number Interviewed: 7 (47%)
SIC Code: 7395

Photofinishing laboratories, in the processing of using chemicals to develop film generate hazardous wastes in the form of spent solutions, acids and containers. The use of silver nitrate as the primary chemical typically leaves spent solutions high in silver concentration. While many laboratories do in fact have silver recovery systems to recapture the valuable silver, other hazardous wastes remain.

Of the 7 related businesses interviewed, all reported generating some type of hazardous waste (Table 4). Waste photochemical solutions were the most significant wastes reported by 6 shops. While quantities appeared to be relative to employment, an average monthly quantity of 131 gallons for the waste solutions was reported by generators. Other wastes included used silver sludge, acetic acid and sulfuric acid.

Characteristic of the photofinishing industry is the tendency to dispose of wastes into the sewer. In fact, all of the waste reported was either disposed of by pouring down the drain or by placing into the trash. Sewered solutions may be below legal limitations for effluent silver contration; as a result of diluting solutions with large quantities of water to acceptable levels.

Quantities of Hazardous Waste by Small Quantity Generators

Based on results of the survey and National Generation factors, an estimated 3,500 tons of hazardous waste waste generated by small quantity generators in Champaign County in 1986. Table 5 summarizes the quantities generated within relevant industrial groups. Again, this total quantity includes waste oil, which is regulated under the Illinois Special Waste Laws, and essential to include in future management programs.

Table 4

GENERATION OF HAZARDOUS WASTE BY
PHOTOFINISHING LABORATORIES IN CHAMPAIGN COUNTY

Type of Waste	Process or Waste Stream	No. of Shops Reporting Waste†	Monthly vol. per business (average)	Storage Method (% total generators)	Disposal Method (% total generators)
Photography Waste	Photographic solutions	6	4 - 325 (131) gal.	Plastic containers 16% Inside machine 16% Not stored 67%	Sewer 100%
Silver Sludge	Residue from photchemical solutions	5	2 - 708 (178) oz.	Plastic containers 50% Not stored 50%	Transported off-site for recycling 50% Sewer 50%
Acetic Acid	Stop bath solution	1	0.25 gal.	Not stored	Sewer
Sulfuric Acid	Photographic solution	1	0.25 gal.	Not stored	Sewer

† Total number of shops interviewed in Champaign County = 7.

Table 5

QUANTITIES OF HAZARDOUS WASTE
GENERATED BY SMALL QUANTITY GENERATORS
BY INDUSTRIAL GROUP
IN CHAMPAIGN COUNTY

Group No.	Industrial Group	1986 Quantity (Tons)
1	Pesticide End Users	6
2	Pesticide Application Services	32
3	Chemical Manufacturing	8
5	Formulators	4
6	Laundries	17
7	Other Services	14
8	Photography	32
10	Vehicle Maintenance	2791
11	Equipment Repair	14
12	Metal Manufacturing	295
13	Construction	93
15	Furniture/Wood Manufacturing and Refinishing	1
17	Printing/Ceramics	46
19	Other Manufacturing	20
21	Analytic and Clinical Laboratories	40
22	Educational and Vocational Shops	2
23	Wholesale and Retail Sales	28
Total		**3461**

Figure 1 provides a graphical representation of the business sector breakdown for the total quantities of hazardous waste being generated in Champaign County. Vehicle Maintenance accounts for a 2,790 tons (81.1%) of the total small quantity generated hazardous waste. This quantity primarily is the result of waste oil, with solvents contributing secondary amounts. The next largest industry group is Metal Manufacturing with a quantity of 294 tons (8.6%).

The types of hazardous waste being generated in Champaign County are displayed in Figure 2. With a quantity of 2,272 tons (66.1%), waste oil qualifies as the largest group. Other inorganic solid waste, primarily used car batteries, ranks second with 339 tons (17.9%). Solvents, both halogenated and nonhalogenated, contribute 212 tons (6.2%).

Waste Oil

Vehicle maintenance and metal manufacturing are the two industrial groups which generate waste oil. By virtue of the number of businesses, gasoline service stations remain as the single largest business which generates waste oil at a rate of 929 tons in 1986. Motor freight transportation or trucking are the second largest generator with a 420 ton generation quantity in 1986. Of the 19 vehicle maintenance establishments interviewed locally, an average monthly waste oil generation of 175 gallons was determined.

University of Illinois

The University of Illinois manifests approximately 4,500 kg of hazardous waste per month, and is thus considered a large quantity generator. As such, they are subject to all federal and state regulations for hazardous waste management, and currently utilize many management options for waste minimization, recycling, and proper disposal. Because the University has a Large Quantity Generator status, its laboratories and other potential generators of hazardous waste are not included on Table 1.

The University contracts a Chicago disposal firm for the removal of hazardous waste. Currently, there is a transfer-storage facility on campus, the operation of which is pending a permit. The University does, at present, have SQGs "piggybacking" off its disposal contract. This capability is limited, so requests from many other SQGs must be denied.

Figure 1

Quantities of Hazardous Waste Generated by Small Quantity Generators in Champaign County in 1986 (by industry group)

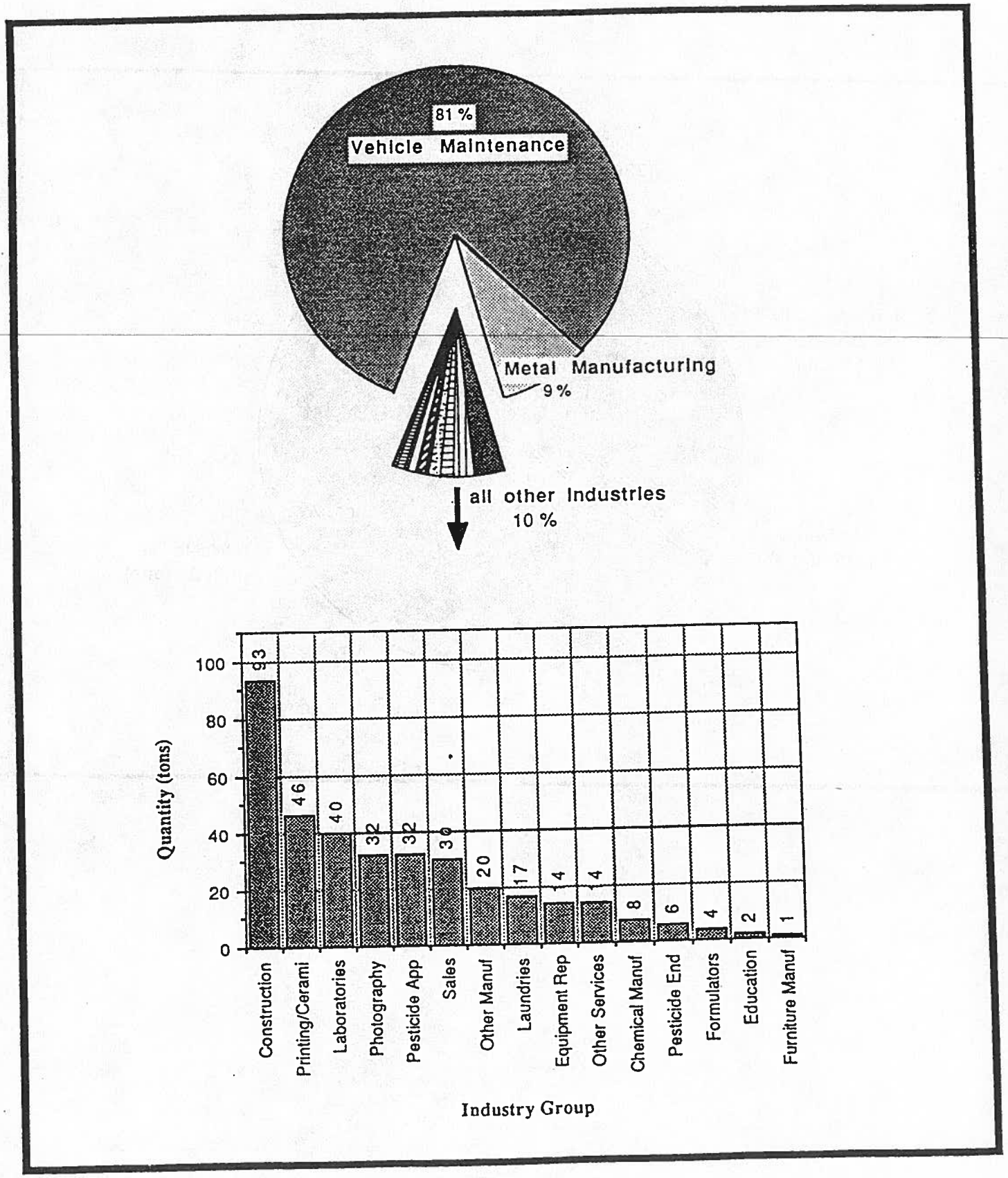
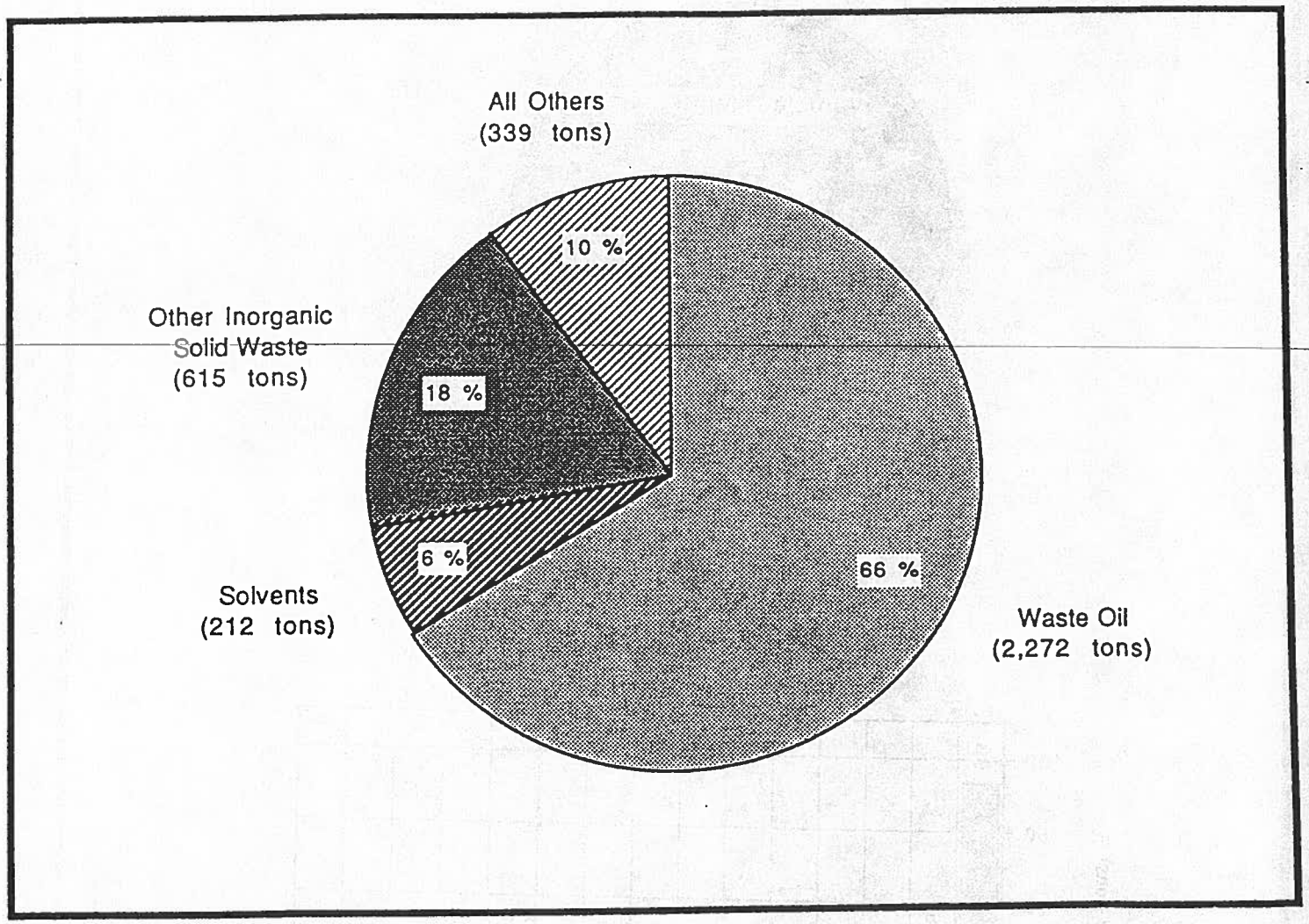


Figure 2

Types of Hazardous Waste Generated by Champaign County SQGsin 1986



APPENDIX SIX

Solid Waste Collection Information

PERCENT OF HOUSEHOLDS IN EACH CITY AND RING AND COUNTYWIDE HAVING EACH HAULER, FOR THOSE HOUSEHOLDS HAVING HAULERS. *(Number in parentheses)*

		CIRCLES AND RINGS						COUNTYWIDE
	HAULER[1]	CITY OF CHAMPAIGN	CITY OF URBANA	URBAN FRINGE	VILLAGE OF RANTOUL	INNER RING	OUTER RING	TOTALS
01	ABC Sanitary	5.5 *(14)*	4.0 *(9)*	4.3 *(3)*	0	0	0	3.5% *(26)*
02	JR Sanitary	0	1.3 *(3)*	1.4 *(1)*	0	0	0	0.5% *(4)*
03	Al's Hauling	0	0	0	0	0	5.4 *(4)*	0.5% *(4)*
04	Appl Sanitary Service	0	0	0	0	38.7 *(24)*	14.9 *(11)*	4.7% *(35)*
05	Area Garbage Service	0.8 *(2)*	0	0	0	4.8 *(3)*	0	0.5% *(5)*
06	C & S Sanitary Company	0	0	0	68.5 *(37)*	9.7 *(6)*	2.7 *(2)*	6.1% *(45)*
07	Chris's Sanitary	0	9.3 *(21)*	2.9 *(2)*	0	1.6 *(1)*	2.7 *(2)*	3.5% *(26)*
08	Cook's Sanitary	2.7 *(7)*	1.3 *(3)*	0	0	0	2.7 *(2)*	1.6% *(12)*
09	Dillman Sanitary Hauling	0	0.4 *(1)*	4.3 *(3)*	0	4.8 *(3)*	10.8 *(8)*	2.0% *(15)*
10	Correy	2.4 *(6)*	0	0	0	0	1.4 *(1)*	0.9% *(7)*

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	HAULER	CIRCLES AND RINGS						COUNTYWIDE
		CITY OF CHAMPAIGN	CITY OF URBANA	URBAN FRINGE	VILLAGE OF RANTOUL	INNER RING	OUTER RING	TOTALS
11	Disposal Waste	0.8 *(2)*	0	0	0	0	0	0.3% *(2)*
13	Hayden Sanitary Service	2.4 *(6)*	0	0	0	0	0	0.8% *(6)*
14	H & M Disposal	0	0	1.4 *(1)*	0	0	10.8 *(8)*	1.2% *(9)*
17	Hustler's Sanitary Services	3.5 *(9)*	2.6 *(6)*	(4.3) *(3)*	0	1.6 *(1)*	0	2.6% *(19)*
18	U/C Sanitary or C/U Sanitation	0.4 *(1)*	0.4 *(1)*	1.4 *(1)*	0	0	0	0.4% *(3)*
19	Illini Sanitary Services	0	9.7 *(22)*	1.4 *(1)*	0	0	0	3.1% *(23)*
21	J & N Disposal	0	0	0	0	12.9 *(8)*	4.1 *(3)*	1.5% *(11)*
23	C.E.Johnson Sanitary Hauling	0	2.6 *(6)*	1.4 *(1)*	0	1.6 *(1)*	0	1.1% *(8)*
24	Klean-Way Disposal	0	4.4 *(10)*	0	0	0	0	1.3% *(10)*
25	McLaughlin Services	0	3.1 *(7)*	2.9 *(2)*	0	1.6 *(1)*	0	1.3% *(10)*
26	La Valle Hauling	07.5 *(19)*	2.2 *(5)*	1.4 *(1)*	0	0	0	3.4% *(25)*

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	HAULER	CIRCLES AND RINGS						COUNTYWIDE
		CITY OF CHAMPAIGN	CITY OF URBANA	URBAN FRINGE	VILLAGE OF RANTOUL	INNER RING	OUTER RING	TOTALS
27	Mackey	0.8 *(2)*	0	2.9 *(2)*	0	0	0	0.5% *(4)*
28	G.R. Leach Sanitary	0	0	0	0	0	2.7 *(2)*	0.3% *(2)*
30	C.H. Miller .	0.8 *(2)*	0.4 *(1)*	0	0	0	0	0.4% *(3)*
32	Bill Nelson Sanitary	3.5 *(9)*	0	0	0	0	1.4 *(1)*	1.3% *(10)*
90	Paxton Sanitary System	0	0	0	0	0	2.7 *(2)*	0.3% *(2)*
33	Rantoul Sanitary Service	0	0	0	9.3 *(5)*	0	0	0.7% *(5)*
38	USI Waste Systems	10.2 *(26)*	0.4 *(1)*	5.8 *(4)*	0	0	1.4 *(1)*	4.3% *(32)*
39	Uden & Sons Sanitary	0	11.9 *(27)*	2.9 *(2)*	0	0	0	3.9% *(29)*
40	United Waste Systems	20.8 *(53)*	6.6 *(15)*	8.7 *(6)*	0	1.6 *(1)*	5.4 *(4)*	10.7% *(79)*
41	Wetmore Disposal	5.5 *(14)*	1.8 *(4)*	2.9 *(2)*	0	0	1.4 *(1)*	2.8 *(21)*
42	Willis *Walter	0.8 *(2)*	2.2 *(5)*	0	0	0	0	0.9 *(7)*

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	HAULER	CIRCLES AND RINGS: CITY OF CHAMPAIGN	CITY OF URBANA	URBAN FRINGE	VILLAGE OF RANTOUL	INNER RING	OUTER RING	COUNTYWIDE TOTALS
43	Winsor Sanitary	0.4 *(1)*	2.2 *(5)*	5.8 *(4)*	0	0	0	1.3 *(10)*
44	Sollar's Sanitary Service	0	0	1.4 *(1)*	11.1 *(6)*	0	1.4 *(1)*	1.1 *(8)*
45	Wrona Bros.	0.8 *(2)*	0	0	0	0	0	0.3 *(2)*
46	Mark L Smith.	0.8 *(2)*	0	0	0			0.3 *(2)*
50	All Others[2]	0.8 *(2)*	1.8 *(4)*	7.2 *(5)*	3.7 *(2)*	3.2 *(2)*	2.7 *(2)*	2.3 *(17)*
	"Don't Know"	28.2 *(72)*	30.4 *(69)*	34.8 *(24)*	7.4 *(4)*	16.1 *(10)*	23.0 *(17)*	26.5 *(196)*
	TOTALS	100.0 *(255)*	100.0 *(227)*	100.0 *(69)*	100.0 *(54)*	100.0 *(62)*	100.0 *(74)*	100.0 *(741)*

[1] Some haulers listed here have merged. One such merger combines United Waste Systems, Wetmore Disposal, and Wrona Disposal. Another hauler that merged with United Waste was Ecology Minded Systems, which received one citation in the survey and was recoded as a United Waste customer. Other mergers or cooperative agreements among haulers on the list may also exist but are not confirmed as of the date of preparation of this table (2/15/89). In addition, two haulers that are coded in the raw data file have been recoded into the "all others" category because they received only one citation each. These recoded haulers are Waste Management (originally code number 16), Kaufman (originally code number 22). One hauler that, in the raw data file, was coded in the "all other" category was recoded to a separate category because it received two citations; this hualer is identified in the table as the Paxton Sanitary System.

[2] "All Others" include the following 17 companies, individuals, or misnamed haulers, each of which was mentioned by only one respondent: A-1, Champaign Sanitary Control, Combest, D & ? Disposal, Mike Danitaty Hauling, Disposable Inc., ETM, Fallers, Larry Davin, Kaufman, Rott's Disposal, Sallee & Son, Villa Grove Company, Waste Management, Larry Wegerd, Wheel Sanitary, Wright.

Average Monthly Residential Hauling Bill, 1988

By Hauler, By Circle

Hauler	City of Champaign	City of Urbana	Urban Fringe	Village of Rantoul	Inner Ring	Outer Ring	County-Wide
ABC Sanitary	$10.75	$11.50	$11.50				$11.09
Al's Hauling						$ 7.00	$ 7.00
Appl. San Serv.					$ 8.95	$ 8.82	$ 8.91
Area Garbage Service	$14.00				$13.33		$13.60
Bill Nelson Sanitary	$13.75					$13.00	$13.67
C.E. Johnson Sanitary Hauling		$17.50	$12.00				$16.71
C. H. Miller	$13.00	$12.00					$12.67
C & S Sanitary Co.				$ 9.90	$ 8.60	$10.00	$ 9.72
Chirs' Sanitary		$13.43	$15.00			$22.00	$13.87
Cook's Sanitary	$13.57	$10.66				$ 6.00	$11.58
Correy	$12.66					$13.00	$12.71
Dillman Sanitary Hauling		$11.00	$11.00		$19.33	$10.00	$12.46

Hauler	City of Champaign	City of Urbana	Urban Fringe	Village of Rantoul	Inner Ring	Outer Ring	County-Wide*
Disposal Waste	$12.50						$12.50
G.R. Leach Sanitary						$11.50	$11.50
H & M Disposal			$ 7.00			$ 6.25	$ 6.33
Hayden Sanitary Service	$10.83						$10.83
Hustler's	$11.67	$13.00	$13.00		$10.00		$12.21
Illini Sanitary Service		$14.78	$10.00				$14.53
J & N Disposal					$10.86	$ 6.50	$ 9.89
Klean-Way		$11.43					$11.43
LaValle Hauling	$11.71	$11.00					$11.55
Mackey	$11.00		$13.00				$11.67
Mark Smith	$13.00						$13.00
McLaughlin Services		$10.67	$11.00		$10.00		$10.67
Rantoul Sanitary Service				$ 9.20			$ 9.20
Sollar's Sanitary Service			$ 7.00	$ 9.00		$ 7.00	$ 8.43

Hauler	City of Champaign	City of Urbana	Urban Fringe	Village of Rantoul	Inner Ring	Outer Ring	County-Wide*
U/C or C/U Sanitary or Sanitaiton	$12.00	$10.00					$11.00
Uden & Sons Sanitary		$10.96	$ 9.50				$10.85
United Waste Systems	$12.64	$10.60	$11.60		$12.00	$10.75	$12.07
USI Waste Systems	$11.52	$15.00	$ 9.33			$14.00	$11.50
Waste Mgmt.		$ 9.00					$ 9.00
Wetmore Disposal	$11.67	$11.50	$10.00			$11.00	$11.36
Walter Willis	$30.00	$12.40					$15.33
Winsor Sanitary	$12.00		$12.33				$12.13
Others	$12.00	$12.50	$ 9.00	$ 9.50	$11.00	$ 6.00	$10.25

* Countywide means is calculated using all responses for that hauler

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APPENDIX 7

Addendum: Updated Information

The following is an update of Table 19 - Available Long-Term Disposal Capacity: East Central Region. The dates are for 1989-1990. The updated information was obtained from the IEPA's Available Disposal Capacity For Solid Waste in Illinois: Fourth Annual Report (October 1990). As part of preparing the Fourth Annual Report, the Agency discovered some landfill owners/operators had provided erroneous capacity estimates earlier. In the east central region, there were two landfills with more than a 25% increase in capacity:

1) Macon County Landfill #2 and #3 (Macon County)
2) Rantoul Municipal Landfill (Champaign County)

This new information is reflected in the updated table. Other capacity increases represent expansions and more accurate reporting. Eight (8) landfills in the region reported higher capacity in the Fourth Annual Report than they did in the Third Annual Report. The remaining fourteen (14) landfills reported less capacity. Below is an update of the landfills in the region with the capacity to handle all of Champaign County's solid waste for four years or more.

(1) Environmental Reclamation (Coles County) - 14.6 years
(2) Diebel (Effingham County) - 10.1 years
(3) Illinois Waste System (Iroquois County) - 5.3 years
(4) Kendall (Iroquois County) - 5.4 years
(5) Envirile (Livingston County) - 14.6 years
(6) McLean County (McLean County) - DELETE - 0 years
(7) H&L #2 (Vermillion County) - 14.0 years.

ADDITIONAL

(8) Clinton Landfill (DeWitt County) - 19.5 years
(9) Macon County (#2 & #3) (Macon County) - 11.0 years
(10) Sexton/McLean County (McLean County) - 7.0 years

TABLE 19 - UPDATED

Available Long-Term Disposal Capacity:
East Central Region, 1989-1990

County Landfill Facilities	Reported Remaining Capacity (1990)[1]	Reported Gate Yards Received (1990)[2]	Reported Years Remaining (1990)[2]	Years Remaining Receiving All Champaign Co. Waste[3]
Champaign County				
Rantoul Municipal	749,000	96,296	8	3.9
Clark County				
Casey Municipal	89,775	13,225	2	0.4
Coles County				
Mattoon/Service Disposal #3	48,727	47,885	1	0.2
Environmental Reclamation	4,964,351	235,649	21	14.6
DeWitt County				
Clinton Landfill[4] (U-Dump-It)	5,367,300	133,911	N/A	19.5
Douglas County				
Multi-County	1,693,308	386,276	4	0[5]
Effingham County				
Diebel (Landfill 33 Ltd)	2,533,458	93,732	27	10.1
Ford County				
Paxton Municipal #2	649	10,351	18	0.0
Iroquois County				
Illinois Waste System	2,696,828	494,828	10	5.3
Kendall (K&H Disposal)	1,927,331	255,669	3	5.4
Livingston County				
Envirite Corp. (Livingston)	3,878,160	124,726	26	14.6
Streator (Area)	132,276	117,724	1	0.4

TABLE 19 - UPDATED *CONT.*

Available Long-Term Disposal Capacity:
East Central Region, 1989-1990

County Landfill Facilities	Reported Remaining Capacity (1990)[1]	Reported Gate Yards Received (1990)[2]	Reported Years Remaining (1990)[2]	Years Remaining Receiving All Champaign County Waste[3]
Macon County				
Bath	0	2,899	0	0
Waste Hauling	585,691	227,309	2	1.8
Macon County(#2 & #3)	4,720,220	375,537	13	11.0
McLean County				
Bradd	7,448	30,406	1	0
McLean County	0	456,092	0	0[6]
Sexton/McLean County[7]	8,500,000	0	7	7
Moultrie County				
Loveall	106,421	43,579	2	0.4
Piatt County				
Monticello Municipal	0	1,209	0	0[8]
Shelby County				
Mentzer	26,780	390	0	0
Vermilion County				
H & L #2 (#3)	6,508,120	678,817[9]	10	14.0
Thomas (#1)	432,523	49,801	7	1.9

(1) Expressed as in-place landfill yards.
(2) As reported by the IEPA in the Available Disposal Capacity For Solid Waste In Illinois: Fourth Annual Report. Gate yards and reported years of capacity remaining self-reported by operator.
(3) Total Champaign County compacted gate yards per year is approximately 306,228 cubic yards in 1989. Excludes material recycled or disposed of on-site.
(4) Expansion permit issued after Capacity Report printed, therefore, reported years remaining not available. Reported gate yards received figure from Fourth Annual Capacity Report.
(5) Closed in July, 1990.
(6) Closed March 31, 1990.
(7) Opened April, 1990. The Capacity Report lists 0 gate yards received in 1989-1990 and reported 7 years remaining. With the reported capacity, it was assumed that the Sexton/McLean County landfill could take all of Champaign County's waste during the reported seven years remaining.
(8) Closed January 1, 1990.
(9) Adjusted to account for waste already disposed of in Vermilion County from Champaign County after the Douglas County facility closed.

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