

Final Report

Non-MSW Survey Results

Georgia Department of Community Affairs

June 2002



Georgia Department of Community Affairs NON-MSW SURVEY RESULTS

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Letter of Transmittal
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Introduction

The Georgia Department of Community Affairs (GDCA) is aware that a significant number of Georgia's municipal solid waste (MSW) landfills receive a potentially large fraction of non-MSW waste (e.g., agricultural waste, biosolids, manufacturing waste). Such non-MSW waste contributes significantly to the State's MSW waste stream for reporting purposes to the State legislature and for measuring the State's progress in achieving the State's 25 percent MSW waste reduction goal. However, this non-MSW waste is significantly different from the residential and commercial waste that is disposed at most MSW landfills across the State.

R. W. Beck conducted a telephone/fax survey of the State's 63 municipal solid waste (MSW) landfills (lined and unlined) in order to gather information about the quantity of non-MSW waste disposed at MSW facilities. Responses were ultimately received from 47 of the 63 facilities (75 percent), including 10 of the 12 largest MSW landfills in the State.

The primary focus of the survey was to better understand the types of waste being disposed at each facility. Specifically, the following four categories of waste were defined for the study:

Municipal Solid Waste (MSW): Solid waste from single-family and multifamily residences (including septic tanks); and from businesses such as retail, offices, restaurants, warehouses, grocery, hotel/motel, and institutions such as schools, universities and government buildings.

Construction/Demolition Waste: Solid waste resulting from construction, remodeling, repair, and demolition operations on pavements, houses, commercial buildings and other structures. Examples include asbestos, wood, bricks, metal, concrete, wall board, asphalt shingles, and other inert waste from C&D operations.

Industrial Waste: Solid waste generated by specific manufacturing or industrial processes that is not a hazardous waste. Examples include wastes resulting from manufacturing processes such as: electric power generation; fertilizer/agricultural chemicals; food and related products/byproducts; inorganic chemicals; iron and steel manufacturing; leather and leather products, nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Sludge/Biosolids: Any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant. Excludes septic tank waste (which is included in MSW).

In addition to the quantity/proportion of non-MSW waste received, the survey sought information about electronics, wood diversion practices, and various other topics. The survey instrument is included as Appendix A.

Results

Responses were received from 47 of the 63 landfills (75 percent). Survey results are summarized in the sections below.

Quantity/Proportion of Waste Received

Forty-two of the 47 respondents (89 percent) were able to provide information about the quantity/proportion of waste received. In some cases, landfills actually tracked materials by type, and were able to derive accurate data based on scale records. However, most landfills did not track incoming waste quantities by the categories in the survey. Respondents from these facilities estimated the proportion of each material type based on local knowledge of their customer base (backed by scale records in some cases). Table 1 summarizes the weighted average breakdown of materials received at landfills in Georgia, based on responses from 42 facilities.

Table 1
Waste Composition

Type of Waste	Weighted Average Percentage	Maximum Percentage	Minimum Percentage	Median Percentage	No. of Facilities Receiving
MSW	66.6%	100.0%	30.0%	69.2%	42 (100.0%)
Construction & Demolition	12.3%	50.0%	0.0%	9.5%	37 (88.1%)
Industrial Waste	14.0%	53.3%	0.0%	10.5%	32 (76.2%)
Sludge/ Biosolids	7.1%	22.0%	0.0%	2.0%	30 (71.4%)

It is interesting to note that the median percentage of C&D, industrial waste, and sludge/biosolids is less than the weighted average percentage, in some cases significantly. This suggests that several large facilities with significant incoming quantities of C&D, industrial waste, and sludge are responsible for a large percentage of these wastes overall, and that most facilities receive less than the weighted average shown in the Table.

The 47 responses were also segregated according to several characteristics to evaluate patterns of waste disposal. First, facilities were divided by size, which was measured by the quantity of incoming waste. “Large” facilities were defined as those receiving more than 200,000 tons of waste annually, or the equivalent of roughly 600 tons per day. Eleven facilities were defined as “large,” with the remaining 36 facilities classified as “small.” Landfills were also divided by ownership, with 34 landfills

being publicly owned/operated and 13 landfills privately owned/operated¹. Finally, results have been separated for unlined landfills, of which four responded to the survey. Table 2 summarizes the weighted average percentage breakdown of materials received at landfill based on ownership; size; and separately for unlined landfills.

Table 2
Waste Composition by Facility Size

Type of Waste	Weighted Average Percentage				
	Facility Size		Owner/Operator		Unlined
	Large ¹	Small ²	Public	Private	
MSW	68.5%	63.2%	65.9%	67.1%	79.2%
Construction & Demolition	12.8%	11.2%	10.7%	13.1%	17.2%
Industrial Waste	9.3%	22.9%	19.6%	11.1%	3.6%
Sludge/ Biosolids	9.4%	2.7%	3.9%	8.7%	0.0%

1. Large facilities are defined as receiving a minimum of 200,000 total tons for the fiscal year 2000 as reported in the Georgia Solid Waste Management Report 1999-2000.
2. Small facilities are defined as receiving less than 200,000 total tons for the fiscal year 2000 as reported in the Georgia Solid Waste Management Report 1999-2000.

It is interesting to note that the percentage of MSW received is fairly constant regardless of the classification shown in Table 2. More significant differences are noted in other materials. These differences include:

- Unlined landfills reported markedly more C&D debris compared to lined landfills;
- Small and/or publicly-owned facilities reported significantly more industrial waste; and
- Large and/or privately-owned facilities reported significantly more sludge and biosolids;

The reasons for these differences were not expressly investigated as part of this study.

C&D or Inert Landfills

All of the 47 respondents were able to provide information about C&D and/or inert landfills co-located at or in close proximity to the MSW facility. Table 3 provides a detailed breakdown of these responses.

¹ Note that there is a strong correlation between a landfill's size and the ownership status of the facility: large facilities tend to also be privately owned. Accordingly, the results for these two strata tend to track closely throughout this analysis.

Table 3
C&D and Inert Landfills

Landfill Type within Close Proximity	% of Respondents
C&D	25.5%
Inert	21.3%
Both	8.5%
Neither	44.7%
Total Responses	47

In total, 55 percent of respondents indicated that they had access to a C&D or inert landfill co-located with or in close proximity to their MSW landfill.

It is interesting to note that MSW landfills that have a C&D or inert landfill on-site or in close proximity had significantly less C&D being disposed as MSW. However, the proximity of a C&D or inert landfill actually had a negative correlation with the percentage of industrial waste disposed at MSW landfills. MSW landfills with a C&D or inert landfill nearby were found to receive a significantly higher percentage of industrial waste. A full comparison of the impact of proximate C&D/inert landfills on the composition of waste received at MSW landfills is shown in Table 4.

Table 4
Impact of Co-located or nearby C&D/Inert Landfills on MSW Landfill Composition

Type of Waste	Weighted Average Percentage	
	C&D and/or Inert Landfill Co-located or Close Proximity	No C&D and/or Inert Landfill Co-located or Close Proximity
MSW	64.2%	68.9%
Construction & Demolition	9.7%	14.7%
Industrial Waste	18.3%	10.1%
Sludge/ Biosolids	7.8%	6.4%

Wood Waste Diversion Program or Grinding Operation

Twenty of the 47 respondents (43 percent) stated they currently have wood waste diversion programs or grinding operations at their landfill. Landfills offering wood waste processing are predominantly public facilities. Table 5 summarizes the incidence of wood waste processing at different facility strata.

Table 5
Use of Processed Wood Waste

Facility Type	Total Respondents	Respondents with Wood Waste Diversion	Percent
Private	13	2	15.4%
Public	34	18	52.9%
Large	11	3	27.3%
Small	37	17	45.9%
Unlined	4	3	75.0%
All facilities	47	20	43%

The majority of the landfills that process wood waste offer the ground wood free of charge to county residents. Table 6 summarizes how landfills use the processed wood waste. The table further segregates the results by ownership; size; and separately for unlined landfills.

Table 6
Use of Processed Wood Waste

How Processed Wood Waste is Used	% of All Respondents	Public	Private	Large	Small	Unlined
Dispose in Landfill	15.0%	11.1%	50.0%	33.3%	11.8%	0.0%
Market	50.0%	55.6%	0.0%	33.3%	52.9%	66.7%
Landfill Landscaping	10.0%	5.6%	50.0%	33.3%	5.9%	0.0%
Combination of the Above	25.0%	27.8%	0.0%	0.0%	29.4%	33.3%
Total Responses	20	18	2	3	17	3

At first glance, Table 6 shows significant differences between public/private and large/small facilities. Due to the limited number of responses from the private and large facilities, it unfortunately is not possible to draw strong conclusions about differences between these strata. However, given the dramatic differences shown based on the limited number of responses, it may be worth further investigation to determine if such differences do in fact exist in the full universe of landfills.

Note also that several facilities reported additional factors relative to wood waste processing. Two public facilities reported that they recently discontinued their wood waste diversion and grinding operations due to high costs, while two other public facilities are currently researching the benefits of entering into the mulching business.

Recyclable Materials at Working Face

Many respondents reported that permit restrictions and/or operational safety policies prohibited the retrieval of recyclable materials at the working face of the landfill. However, twenty-six of the 47 respondents (55 percent) indicated that they pull materials from the working face.

Practically all facilities that pull recyclables from the working face included tires. Table 7 summarizes the recyclable materials that were reported to be pulled from the working face. The table further stratifies results by ownership; size; and separately for unlined landfills. (Note that respondents may have reported pulling multiple recyclable materials from the working face, and totals therefore sum to more than 100 percent.).

Table 7
Types of Recyclable Materials Pulled at Working Face

Recyclable Material	% of All Respondents	Public	Private	Large	Small	Unlined
Appliances	73.1%	85.0%	16.7%	16.7%	85.0%	100.0%
Scrap Metal	42.3%	45.0%	16.7%	16.7%	45.0%	0.0%
Tires	92.3%	85.0%	100.0%	100.0%	85.0%	33.3%
Other	15.4%	15.0%	0.0%	0.0%	15.0%	0.0%
Total Responses	26	20	6	6	20	3

The “Other” recyclable materials that were reported to be pulled from the working face included:

- Kids toys to be donated to fire department;
- Cardboard; and
- Wood.

Once again, there appears to be significant differences by landfill type. Smaller, public landfills are more likely to attempt to pull recyclables such as appliances and scrap metal from the working face. Interestingly, large and private landfills uniformly reported that they pull tires from the working face, while not all small and public landfills reported this practice. Failure to remove tires can result in additional problems during post-closure.

Delivery and Handling of Electronics

All of the 47 respondents provided information about the delivery and handling of electronics at their facility. Over three-quarters of the facilities reported that the only electronics received were mixed with other materials. Of the three facilities that reported receiving only source separated electronics, two attempted some recovery. Only one respondent indicated the origin of their source-separated loads (from the

local Board of Education), while three facilities stated that they did not accept whole loads of electronics. Table 8 presents the breakdown of respondents.

Table 8
Delivery of Electronics

How Electronics are Delivered	Number of All Respondents	% of All Respondents	Recover Some Electronics
Mixed with other loads	36	76.6%	0
Source-separated	3	6.4%	2
Both	8	17.0%	0
Total Responses	47	47	2

Table 9 provides a more detailed breakdown of the delivery of electronics to the facilities. This table further stratifies results by ownership; size; and separately for unlined landfills.

Table 9
Delivery of Electronics

How Electronics are Delivered	Public	Private	Large	Small	Unlined
Mixed with other loads	73.5%	84.6%	90.9%	72.2%	75.0%
Source-separated	5.9%	7.7%	0.0%	8.3%	0.0%
Both	20.6%	7.7%	9.1%	19.4%	25.0%
Total Responses	34	13	11	36	4

While most disposed electronics were generally reported to be mixed with other material, it is of interest to note that none of the large facilities reported receiving any source-separated loads. This result may be misleading, as larger landfills with higher truck traffic would be less likely to identify source-separated loads and report such loads on this survey. Note that this survey did not attempt to obtain additional details about electronics disposal, and further inquiry may be needed to better understand the handling of electronics at Georgia’s landfills.

The projected increase in the quantity of old electronics requiring disposal has been widely reported by various industry experts and in the trade press. Only 14 out of 47 respondents (30 percent) reported an increase in electronics being disposed, and as mentioned previously, only two out of 47 (4 percent) reported recovering some electronics. If electronics were already a problem at Georgia’s landfills, it seems likely that they would have been more widely reported in this survey.

R. W. Beck recently completed MSW composition studies at landfills in Pennsylvania and Florida. Based on our field observations in these other states, electronics are not readily observable in incoming loads. It may have been noteworthy that several

survey respondents cited an increase in the number of inquiries from local generators of electronics, which may have enabled the electronics to be diverted prior to disposal. It is likely that additional study is needed, not only at the disposal sites but among generators and the existing recovery and donation infrastructure, to fully understand the impact of old electronics on the waste stream.

Litter Prevention

All of the 47 respondents provided information about litter prevention policies. The majority of respondents indicated that the county ordinance dealt with the issue of untarped or uncovered loads. Facilities with special policies were usually aligned with the County ordinance. These policies primarily existed to compensate the facilities for the additional costs incurred at the facility for handling untarped/uncovered vehicles. One facility reported charging twice the tipping fee to uncovered loads, and donating the additional revenue to litter control. Table 10 provides detailed breakdown of responses. The table further segregates results by ownership; size; and separately for unlined landfills.

Table 10
Litter Prevention Policies

Policies for Untarped Loads	No. of Respondents	Public	Private	Large	Small	Unlined
Monetary Fine	14.9%	11.8%	23.1%	18.2%	13.9%	0.0%
Decline load	14.9%	5.9%	38.5%	45.5%	5.6%	0.0%
No policy	70.2%	82.4%	38.5%	36.4%	80.6%	100.0%
Total Responses	47	34	13	11	36	4

According to the responses received, large and/or private facilities were two to three times more likely than small and/or publicly owned landfills to issue a monetary fine or decline a load if a vehicle was untarped. Note that a number of facilities indicated that warnings were issued to drivers delivering uncovered loads. These facilities were recorded as having no policy if “warning” loads were still accepted.

Gate Surveys

Phone surveys provided all of the information presented in the previous section. However, it was hypothesized that many facilities may not be able to accurately estimate the breakdown of different waste types received at their facility. To test the validity of the results of the phone survey, the responding landfills were asked if they would be willing to allow a week-long gate survey to be conducted at their landfill. The purpose of the gate survey would be to interview the drivers of all incoming vehicles for a one-week time period to ascertain the type of waste being delivered. Results of the gate survey could then be used to validate the responses provided in the phone survey.

The proposed gate surveys encountered some opposition. Landfill owner/operators—especially at privately owned landfills—considered the information that could be gathered at a gate survey to be confidential, as such a survey would necessarily allow access to the full range of each facility’s clients. In the competitive hauling marketplace that exists in Georgia, this issue all but eliminated the privately-owned landfills from allowing such a study to be conducted.

Ultimately, gate surveys were conducted at a total of five landfills distributed across different geographic areas of Georgia. Only one of the five facilities was privately-owned. At the request of gate survey participants, facility names, locations, and results are not disclosed in this report.

A full week of gate surveying was performed at each facility. Data collected in the gate survey included the type of vehicle hauling the load; the percent of MSW, industrial waste, C&D, and sludge/biosolids; and the weight of the entire load. The full week’s worth of incoming truck data was aggregated to calculate the actual percentage of the target material types delivered to that facility.

Table 11 shows the results of both the phone survey and the gate survey, and compared the variance between the two for the five landfills at which gate surveys were conducted. A positive variance indicates a greater percentage was reported in the phone survey; negative variance means the gate survey percentage was higher.

Table 11
Variance Between Telephone Survey and Gate Survey Results

Type of Waste		Facility 1	Facility 2	Facility 3	Facility 4	Facility 5
	Ownership	Public	Private	Public	Public	Public
	Size (tpd)	<500	>1,000	<1,000 and >500	<500	<500
MSW	Phone Survey	50.0%	75.5%	73.0%	30.0%	50.0%
	Gate Survey	42.8%	80.1%	84.0%	55.3%	69.3%
	Variance	7.2%	-4.5%	-11.0%	-25.3%	-19.3%
Construction & Demolition	Phone Survey	10.0%	5.0%	15.0%	19.0%	23.0%
	Gate Survey	5.3%	3.1%	14.7%	21.0%	9.1%
	Variance	4.7%	1.8%	0.3%	-2.0%	13.9%
Industrial	Phone Survey	30.0%	9.7%	10.0%	50.0%	26.0%
	Gate Survey	45.4%	3.2%	0.0%	21.3%	20.4%
	Variance	-15.4%	6.5%	10.0%	28.7%	5.6%
Sludge/Biosolids	Phone Survey	10.0%	9.7%	2.0%	1.0%	1.0%
	Gate Survey	6.6%	13.5%	1.2%	2.1%	0.5%
	Variance	3.4%	-3.8%	0.8%	-1.1%	0.5%
Best Result [1]		Gate	No difference	Phone	Gate	Gate [2]

[1] Participating facilities were asked to indicate which results were most accurate, either the “Gate” survey or the “Phone” survey.

[2] Facility indicated that seasonal differences likely contributed to discrepancies between gate and phone survey results

It is notable that the phone survey and gate survey results for all of the facilities were comparable for many of the material types. However, some significant differences were observed, especially in the classification of industrial waste vs. MSW.

To investigate these differences, the five host facilities were contacted to discuss variances between the telephone survey and gate survey. Facilities identified the primary cause for the survey variance to be the difficulty in determining the industrial waste quantities. However, some of the variance between the phone survey and the gate survey results was attributed to weekly and seasonal variation that could not be captured in a weekly gate survey. With the exception of one facility that cited significant seasonal differences, all facilities indicated that the gate survey likely provided an equal or better estimate of incoming material percentages than that provided by the facility as part of the phone survey.

Conclusions

The comprehensive phone survey and follow-up gate surveys conducted as part of this study represent a useful first step in better understanding the breakdown of waste types received at Georgia's MSW landfills.

Regarding the phone survey, although many responses were received, not all landfills responded to the survey. While we have no reason to expect that the non-responsive landfills are significantly different from the responsive landfills, it is possible that the missing responses from several of the larger landfills could alter the results shown here. It is unlikely that responses from the non-responsive, smaller facilities would significantly affect the outcomes shown.

Note also that the percentage breakdown of waste types in many cases relied on educated estimates from landfill operators. By definition, there is some uncertainty to these results. Because of this uncertainty, the second phase of this project entailed conducting several gate surveys at selected facilities to validate the estimates provided in this survey. The results of the gate survey suggests that most facility operators can reasonably estimate the quantity of C&D and sludge/biosolids entering their landfills, but may have more difficulty estimating the quantity of industrial waste. Because of the variety and geographic distribution of industrial generators, it may not be possible to verify the industrial waste portion of the State's waste stream without more rigorous reporting mechanisms in place.

Appendix A
NON-MSW WASTE SURVEY

Georgia Department of Community Affairs

NON-MSW WASTE SURVEY

Hello, my name is _____, and I am calling you on behalf of the State of Georgia's Department of Community Affairs. As you know, the State has targeted a 25% MSW reduction goal. We are contacting you for a project that will ultimately help the State to better understand its options for meeting this goal. We are requesting your assistance at quantifying the different types of waste that are currently being disposed at your MSW landfill. Specifically, we are hoping to gain an understanding of the prevalence of construction and demolition (C&D) debris, industrial waste, and sludge/biosolids which may currently be disposed at your facility. I would appreciate a few minutes of your time to answer a few questions..

Definitions

We are defining four broad categories of waste for the purpose of this study:

Municipal Solid Waste (MSW): solid waste from single-family and multifamily residences (including septic tanks); and from businesses such as retail, offices, restaurants, warehouses, grocery, hotel/motel, and institutions such as schools, universities and govt. buildings.

Construction/Demolition Waste: waste resulting from construction, remodeling, repair, and demolition operations on pavements, houses, commercial buildings and other structures. Examples include asbestos, wood, bricks, metal, concrete, wall board, asphalt shingles, and other inert waste from C&D operations.

Industrial Waste: solid waste generated by specific manufacturing or industrial processes that is not a hazardous waste. Examples include wastes resulting from manufacturing processes such as: electric power generation; fertilizer/agricultural chemicals; food and related products/byproducts; inorganic chemicals; iron and steel manufacturing; leather and leather products, nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste

Sludge/Biosolids: any solid, semi-solid, or liquid waste generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility exclusive of the treated effluent from a wastewater treatment plant. Excludes septic tank waste (which is included in MSW)

Questions

1. Do you track incoming materials by the categories we just discussed?
 Yes → go to question 3 No

2. If you do not already track this information, would it be possible to derive a reasonable estimate based on scalehouse records?
Yes No

3. As reported to the Georgia Environmental Protection Division (EPD), your facility disposed of _____ tons for FY 2000. Of that amount, _____ tons were reported to be generated by in-State sources. Can you give me an estimated breakdown of these tons across the four waste types we discussed? If you prefer, I can fax you a brief table to fill out and fax back.

Please indicate the tons (or percent of tons) of each type of waste at your facility. Make an educated guess even if you do not have definitive data available.

Type of Waste	Tons	Percentage of Total
MSW		
Construction & Demolition		
Industrial Waste		
Sludge/Biosolids		
Total Disposed, FY 2000	[enter FY2000 total]	100%

4. The State has asked us to perform additional research into the quantity of these four major types of waste at selected landfills across Georgia. Specifically, we would like to explore the possibility of conducting a gate survey of incoming truckloads at your MSW landfill. This would involve one of our staff visiting your facility for several days to survey incoming truckloads to determine what type of waste is being delivered. We won't know if we will be attempting to perform this gate survey at your facility until we contact all of the other MSW landfills in the State, but wanted to alert you to the possibility. Would you consider allowing one of our staff to visit your site for several days to conduct this type of survey? (Note that the project would be staffed entirely by our staff, and would be no cost to your operations.)

Yes No

5. Do you operate a C&D and/or inert landfill at the same site or in close proximity?
Yes No

6. Do you have a wood waste diversion program or wood waste grinding operation at your MSW landfill?
Yes No

If so, do you market or landfill the processed material?

- Market
Landfill
Other _____

7. Do you pull any recyclable materials out of the MSW landfill working face?
Please check all that apply.

- Appliances
- Scrap Metal
- Tires
- Other:

8. How are electronics and electronic equipment (computer monitors, TVs, CPUs, stereos, etc.) being delivered for disposal?

- Mixed with other loads
- Source separated

How have you been handling this material?

- We recover some electronics
- No special handling
- Other comment:

9. Have you noticed an increase in the quantity of electronics and electronic equipment at your MSW landfill in recent years?

- Yes
- No

10. Our final question relates to litter prevention at your landfill. Do you have a policy to require incoming haulers to tarp or otherwise secure incoming loads to prevent litter?

- Yes
- No

If yes, briefly describe the policy and how you enforce it.

Thank you for your time in responding to this survey. Please fax your responses to:

Ms. Veronica Tafur
R. W. Beck, Inc.
407/648-8382 fax