

GREEN SOLUTIONS

ENVIRONMENTAL CONSULTING

2019 RESIDUALS CHARACTERIZATION TEST RESULTS



JULY 2019

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On the cover, clockwise from top – Single-family end-of-belt residuals tested on May 19, 2019; The sorting crew at work on single-family residuals on May 19, 2019; Plastic packaging found in multi-family residuals, May 12, 2019.

2019 RESIDUALS CHARACTERIZATION TEST

INTRODUCTION

This report provides the results of composition tests that were conducted on residuals resulting from processing recyclables collected from two areas of Clark County:

- **Single-Family:** single-family homes in urban areas of Clark County, including the City of Vancouver but excluding Camas, Ridgefield and Washougal.
- **Multi-Family:** apartment complexes, condominiums, and other buildings with multiple dwelling units in Vancouver and Clark County.

These tests were part of the “allocation study” conducted annually by Waste Connections. For the allocation study, materials from geographically-specific residential sources are processed separately from other sources to determine the amounts of various recyclable and non-recyclable materials that are being set out for recycling in different areas of Clark County. This was the fourth consecutive year that the processing residuals from the allocation study were analyzed.

The fieldwork for this study was performed by Green Solutions and teams of sorters on May 12 and May 19, 2019. The sorting teams were organized by Clark County staff and included staff from Clark County, the City of Vancouver, and Waste Connections. For the purposes of this study, items considered “recyclable” were those that adhered to the guidelines shared with residents. These guidelines were developed by the regional solid waste partners (Clark County, cities and towns within Clark County, and Waste Connections).

CONCLUSIONS

The conclusions of this analysis are:

- About one-third of the materials collected from the single-family and multi-family sources were removed as residuals. The residuals from processing the single-family recyclables were 32.0% of the amount processed, and for the multi-family recyclables the residuals were 33.2% of the amount processed. For both sources, these results reverse the trend of increasing amounts of residuals that has occurred in recent years. The amount of residuals removed from single-family recyclables increased from 17.7% in 2016, to 22.7% in 2017 and to 37.7% in 2018, but has now decreased to 32.0%. For the multi-family recyclables, the corresponding figures are 17.5% to 23.0% to 39.8%, and now to 33.2% in 2019.
- Part of the residuals are comprised of “good” recyclables that simply weren’t captured by the processing system for various reasons. The amount of good recyclables in the residuals varied from 35% to 58% depending on the type and source of the residual. Compared to last year, the amount of good recyclables in the residuals is slightly higher but the overall amount of residuals is lower. The net impact is that a slightly lower percentage of the “good recyclables” are being disposed this year than last year.
- Adjusting for the amount of recyclables in the residuals reduced the amount of “bad residuals” (contaminants) to 16.1% non-recyclable residuals for single-family and 19.3% for multi-family. The actual amount of contamination (non-recyclable residuals) removed from the incoming recyclables has changed from 10.6% in 2016 to 14.7% in 2017 to 20.5% in 2018 and now 16.1% for the single-family recyclables, and 12.8% in 2016 to 17.4% in 2017 to 25.3% in 2018 and now 19.3% for the multi-family recyclables (as a percent of the

incoming materials). While this implies that the levels of contamination were previously increasing and now have decreased, it could also simply be due to varying levels of contaminant removal. For example, tests conducted in 2015 and 2016 indicate that the incoming recyclables contained 20% or more contamination but that only about half of the incoming contaminants were actually ending up in the residuals.

APPROACH

The residential and commercial recyclables collected by Waste Connections in Clark County are brought to the West Van Materials Recovery Facility (West Van) for processing. The processing system at this facility uses a variety of mechanical and manual methods to separate mixed recyclables into marketable commodities. Two types of residuals are generated at West Van:

- **End-of-belt (EOB) residuals:** these are the residuals that fall off of the end of the processing system after various types of recyclables have been removed.
- **Other residuals:** this is a mixture of residuals that includes materials manually pulled off of an initial conveyor belt (which includes bagged materials, bulky items and stringy materials such as rope and garden hoses); materials removed from the paper processing lines; materials that are screened out (which includes broken glass, shredded paper, and small or thin items such as bottle caps and metal can lids); and materials that become tangled on screens and then are cut off. For the purposes of this study, the materials cut off of the screens were kept separate and were either visually characterized or sorted.

The recyclable materials used for the allocation study were collected by Waste Connections in the week before each stream of material was processed. Waste Connections set aside materials for each source from routes conducted Monday through Friday, and then separately processed those materials. The residuals and other materials were placed into roll-off containers for weighing purposes after the allocation test. A roll-off container for each type of residual was retained for this analysis, and later emptied onto the tipping floor for sampling purposes (see photos in Attachment A). The stringy materials cut from the screens were also placed in a separate container and were separately evaluated. The schedule for processing the recyclable materials and testing the residuals is shown in Table 1.

Table 1. Schedule for Allocation Study and Residuals Tests		
Source	Allocation Study Date	Residuals Test Date
Multi-Family	May 6	May 12
Single-Family	May 18	May 19

For the composition tests, the sorting crew set up near the piles of residuals for convenient sampling purposes (see Photo 1). Three to four samples were removed from the piles of each type of residual. The target amount for each sample was 100 pounds. Samples were taken from different locations in the residuals piles, with each sample representing a slice of the pile (i.e., consisting of materials from the outer edge to the center of the pile and vertically from the bottom of the pile to the top of the pile). Sampled material was placed into 32-gallon wheeled garbage cans, the weights checked to make sure the total weight was about 100 pounds, and then

Photo 1: Work Area for Residuals Tests



Photo taken May 19, 2019. Photo shows sorting crew for the single-family residuals test, with piles of residuals in the background.

these were set aside until the sorting crew was ready for that sample. Sampling of the residuals was performed by Rick Hlavka (Green Solutions), and the sorting activities were conducted under the supervision of Rick Hlavka.

On the day of each sorting test, Rick Hlavka arrived at West Van an hour before the sorting crew to set up equipment and make other preparations. The sorting crew was provided with health and safety instructions on the first day, followed by a description of the sorting procedures to be used. Since the same staff returned for the second sorting event, it was not necessary to repeat the health and safety training on May 19.

The composition tests of the residuals were conducted using typical sorting methods. Residuals were brought onto a sorting table one can at a time (32-gallon wheeled garbage cans were used for sampling purposes). The sorting crew members, who were positioned around the table, then removed specific materials and placed those into containers around the table according to the list of categories developed for this test (see Attachment B). The containers used for sorting were 32-gallon trash cans and five-gallon buckets. A two-inch screen in the bottom of the sorting table facilitated the removal of “fines” (materials less than two inches in size). As the containers around the table filled up, they were removed, weighed, emptied, and returned to the table. At the end of a sample, all containers were removed, weighed, and emptied. The weight data was recorded on a sample data form designed for this project (see Attachment C).

RESULTS AND OBSERVATIONS

The weights recorded on the sample data form were later entered into a spreadsheet and the percentages for each category were calculated (see Attachment D for the individual sample results). The results for each source are shown in Tables 2 and 3. Three sorting categories (antifreeze, motor oil, and partially-full aerosol cans) are not shown in the tables because these

Table 2. Composition Results for Single-Family Residuals			
	End-of-Belt	Other	Combined
Acceptable Recyclable Materials			
Paper	37.4	32.5	35.2
Paper, Tetrapak	2.4	0.1	1.4
Plastic	17.4	5.2	12.1
Metals	0.9	0.7	0.8
Subtotal, Acceptable Materials	58.1	38.5	49.6
Unacceptable Materials			
Paper	11.9	10.1	11.1
Shredded Paper, in bags	0	0.8	0.3
Shredded Paper, not bagged	0.3	0	0.2
Non-Recyclable Paper	11.5	8.4	10.1
Cardboard, Contaminated	0.2	0.9	0.5
Plastic	18.6	11.2	15.4
Plastic Packaging	13.1	3.8	9.1
Plastic Bags, Bagged	0.08	0.2	0.1
Plastic Bags, Loose Retail	0.02	0.4	0.2
Plastic Bags, Loose Other	0.2	1.4	0.7
Plastic Film and Wrap	0.2	0.7	0.4
Plastic Objects	4.3	4.4	4.4
Styrofoam	0.5	0.1	0.3
Non-Recyclable Bottles	0.1	0.1	0.1
Non-Recyclable Metals	0.1	2.9	1.3
Glass (All Glass)	0.7	7.3	3.6
Other	10.6	30.1	19.1
Biological Wastes	0.6	0.4	0.5
Medical Waste, Medications	0.02	0.02	0.02
Medical Waste, Sharps	0	0	0
Batteries	0	0.04	0.02
Electronics	0.1	0.1	0.1
Food Waste	2.2	0.4	1.4
Yard Debris	0.2	0.1	0.2
Wood, Construction & Demo.	1.4	2.0	1.7
Textiles	0.3	2.9	1.4
Garbage, Bagged	0	5.9	2.6
Fines	4.9	16.9	10.1
Other Wastes	1.0	1.3	1.1
Subtotal, Unacceptable Materials	42.0	61.5	50.4
Total	100.0	100.0	100.0

All figures are percentages by weight.

Table 3. Composition Results for Multi-Family Residuals

	End-of-Belt	Other	Combined
Acceptable Recyclable Materials			
Paper	38.0	31.5	33.6
Paper, Tetrapak	4.2	0.2	1.5
Plastic	13.4	3.1	6.4
Metals	0.5	0.4	0.4
Subtotal, Acceptable Materials	56.1	35.2	41.9
Unacceptable Materials			
Paper	11.6	20.7	17.8
Shredded Paper, in bags	0	0.1	0.05
Shredded Paper, not bagged	0	0	0
Non-Recyclable Paper	11.4	17.4	15.5
Cardboard, Contaminated	0.2	3.2	2.3
Plastic	19.3	11.5	14.0
Plastic Packaging	11.9	2.4	5.4
Plastic Bags, Bagged	0	0.05	0.04
Plastic Bags, Loose Retail	0.01	1.0	0.7
Plastic Bags, Loose Other	0.2	1.6	1.2
Plastic Film and Wrap	0.1	1.8	1.2
Plastic Objects	6.3	3.6	4.5
Styrofoam	0.5	0.2	0.3
Non-Recyclable Bottles	0.2	0	0.1
Non-Recyclable Metals	0.2	0.9	0.6
Glass (All Glass)	1.8	4.8	3.8
Other	11.2	27.8	22.4
Biological Wastes	0.4	0.7	0.6
Medical Waste, Medications	0.02	0	0.01
Medical Waste, Sharps	0.02	0.02	0.02
Batteries	0	0.02	0.01
Electronics	0.2	0	0.08
Food Waste	2.6	1.0	1.5
Yard Debris	0.01	0.01	0.01
Wood, Construction & Demo.	1.4	0.1	0.5
Textiles	1.3	2.6	2.2
Garbage, Bagged	0	0.9	0.6
Fines	5.1	22.3	16.8
Other Wastes	0.1	0.2	0.2
Subtotal, Unacceptable Materials	43.9	64.8	58.1
Total	100.0	100.0	100.0

All figures are percentages by weight.

were not found in any of the samples. The combined results are a weighted average that was calculated from the total weight of each type of residual (this data was provided by Waste Connections staff from the allocation study results). Table 4 shows the weight data used to determine the weighted averages.

Table 4. Weight Data for Residuals			
	Single-Family	Multi-Family	Averages
Total Weight of Materials Processed, pounds	266,640	82,360	
End-of-Belt Residuals:			
Pounds	48,280	8,800	
Percent of Total	18.1%	10.7%	14.4%
Other Residuals:			
Pounds	36,934	18,504	
Percent of Total	13.9%	22.5%	18.2%
All Residuals, Percent of Total	32.0%	33.2%	32.6%

Weight data was provided by Waste Connections.

Comparing the results of the residuals from the two residential sources leads to the conclusion that the two sources are similar in terms of the overall quantity and types of contaminants that end up in the residuals, although there are also some significant differences. The results and other observations about the materials found are described below.

Recyclable Materials: A significant amount of recyclable materials were found in the residuals, especially in the end-of-belt residuals. The combined residuals for the single-family source contained almost 50% (49.6%) recyclable materials, and for the multi-family source this figure was 41.9%.

- **End-of-belt residuals:** as can be seen in Tables 2 and 3, the amount of recyclable materials found in the end-of-belt residuals was significant for both sources, consisting of 58.1% in the single-family residuals and 56.1% in the multi-family residuals. Three-quarters or more of these recyclables was recyclable paper. Recyclable plastics made up most of the rest of the unrecovered materials, and only a small amount of the residuals were recyclable metals.
- **Other residuals:** there were lower amounts of recyclable materials in the other residuals (38.5% in the single-family residuals and 35.2% in the multi-family residuals). In the past some of these materials were found in bags of recyclable materials, which were emptied and sorted by the sorting crew based on the understanding that this is the normal practice for the processing line workers, but very few of these bags were found this year or last year.

Unacceptable Materials: The amounts of unacceptable (non-program or non-target) materials varied from 42.0% in the end-of-belt residuals from single-family recyclables to 64.8% in the other residuals from multi-family recyclables. The fines are the largest category for the other residuals from both sources, and the amount of non-recyclable paper was substantial in all four types of residuals. Plastic packaging was also found in significant amounts, especially in the end-of-belt residuals where it was greater than the amount of non-recyclable paper for both sources, and this

is especially significant given the lightweight nature of this material (in other words, many pieces of this material were needed to add up to this weight).

The non-recyclable paper was examined for most samples to estimate the amount of frozen food packaging and other wet-strength papers. The visual examination of the residuals concluded that frozen food packaging made up about 10% of the non-recyclable paper in the residuals, and other wet-strength papers contributed about 20% to the non-recyclable paper found in the residuals (with clearly more of this being in the other residuals).

As in past years, the fines consisted primarily of broken glass, shredded paper, caps, and small bits of paper and plastic (all types of items less than 2”).

Number of Bags: Additional data collected during the residuals sorting included recording the number of bags containing shredded paper, batteries, recyclables, garbage, and bags of plastic bags. In addition, the number of loose plastic bags (plastic grocery/retail bags and other types of loose plastic bags) were counted. This data is shown in Table 5. For comparison purposes, this data has been converted to the number of each item per 100 pounds of sampled residuals.

Table 5. Number of Problem Items found per 100 pounds of Residuals			
	Single-Family	Multi-Family	Averages
Loose Retail Bags:			
In EOB Samples	2	5	3
In Other Residuals	26	44	35
Loose Other Bags			
In EOB Samples	17	21	19
In Other Residuals	31	60	46
Bags of Plastic Bags			
In EOB Samples	0.3	0	0.2
In Other Residuals	0.2	0.8	0.5
Bags of Shredded Paper, in Plastic Bags			
In EOB Samples	0	0	0
In Other Residuals	0.2	0.3	0.3
Bags of Shredded Paper, in Paper Bags			
In EOB Samples	0	0	0
In Other Residuals	0.2	0	0.1
Bags of Recyclables			
In EOB Samples	0	0	0
In Other Residuals	1.2	1.9	1.5
Bags of Garbage			
In EOB Samples	0	0.7	0.4
In Other Residuals	2.3	1.9	2.1

Composition of Materials Removed from Screens: The stringy and other problematic materials that got caught in the screens during the allocation study were removed from the screens at the end of the test and then weighed. These materials were set aside by Waste Connections for evaluation. This type of residual from the multi-family allocation test weighed only three pounds and the composition was simple enough to allow a visual characterization of it. This material from the single-family test weighed more (in part because more material was processed for the single-family allocation test) and was more complex, so a sample of it was sorted just like the other residuals samples. The results for both sources are shown in Table 6. These results are not included in the weighted average for the other residuals because the amounts are too small to matter. For the single-family recyclables, the materials cut from the screens weighed 68 pounds and amounted to only 0.08% of all residuals from that source. For the multi-family recyclables, the materials cut from the screens amounted to only 0.01% of all residuals from that source.

Table 6. Composition of Materials Removed from Screens		
	Single-Family Residuals	Multi-Family Residuals
Acceptable Recyclable Materials		
Paper	14.2	5
Plastic	1.7	0
Metals	0.9	0
Subtotal, Acceptable Materials	16.9	5
Unacceptable Materials		
Paper	6.9	0
Non-Recyclable Paper	6.9	0
Plastic	17.4	90
Plastic Packaging	0.2	0
Plastic Bags, Loose Retail	1.4	10
Plastic Bags, Loose Other	6.5	20
Plastic Film and Wrap	1.4	50
Plastic Objects	7.9	10
Non-Recyclable Metals	20.0	0
Other	38.7	5
Wood, C&D	0.3	0
Textiles	38.4	5
Subtotal, Unacceptable Materials	83.1	95
Total	100.0	100.0

All figures are percentages by weight.

LOST RECYCLABLES

The residuals contain a substantial amount of recyclable materials that are not being captured by the processing system. Adjusting the weight of the residuals to subtract the recyclable materials leads to the adjusted amounts of non-recyclable residuals shown in Table 7. Figures at the

bottom of Table 7 show the results from previous years for the amounts of all residuals, recyclable materials, and non-recyclable residuals.

Table 7. Adjusted Results for Residuals			
	Single-Family	Multi-Family	Averages
Percent of Incoming Materials Removed as Residuals (2019):			
End-of-Belt Residuals	18.1%	10.7%	14.4%
Other Residuals	13.9%	22.5%	18.2%
Total	32.0%	33.2%	32.6%
Percentage of Recyclable Materials in Residuals (2019):			
End-of-Belt Residuals	58.0%	56.1%	57.1%
Other Residuals	38.5%	35.2%	36.8%
Combined Residuals	49.6%	41.9%	45.7%
End-of-Belt Residuals (2019):			
% Removed from Incoming Non-Recyclable Residuals Only	18.1%	10.7%	14.4%
	7.6%	4.7%	6.2%
Other Residuals (2019):			
% Removed from Incoming Non-Recyclable Residuals Only	13.9%	22.5%	18.2%
	8.5%	14.6%	11.5%
2019 Combined Residuals:			
% Removed from Incoming Percent Recyclables	32.0%	33.2%	32.6%
Non-Recyclable Residuals Only	49.6%	41.9%	45.7%
	16.1%	19.3%	17.7%
2018 Combined Residuals:			
Total Amt. Removed	37.7%	39.8%	38.7%
Percent Recyclables	45.7%	36.4%	41.1%
Non-Recyclable Residuals Only	20.5%	25.3%	22.9%
2017 Combined Residuals:			
Total Amt. Removed	22.7%	23.0%	22.9%
Percent Recyclables	32.9%	36.8%	34.9%
Non-Recyclable Residuals Only	14.7%	17.4%	16.0%
2016 Combined Residuals:			
Total Amt. Removed	17.7%	17.5%	17.6%
Percent Recyclables	39.8%	26.6%	33.2%
Non-Recyclable Residuals Only	10.6%	12.8%	11.7%

COMPARISON TO PREVIOUS COMPOSITION RESULTS

The test of the residuals this year was conducted in a very similar manner to the tests conducted in 2016, 2017 and 2018, although a few adjustments are needed to allow the results to be compared. Two new categories added in 2018 had to be combined with other categories to allow a direct comparison of the results, including adding “biological wastes” to “other” and adding “non-recyclable plastic bottles” to “plastic packaging.” These adjustments also had to be made for the 2019 data. “Tetrapak” was separated this year from other types of recyclable paper, and so these two categories were combined to provide a category for “recyclable paper” that is comparable to previous years. In 2019, the category for “rigid plastics” was combined with “plastic objects” to create a category called “other plastics” and so the data for these two categories for the previous three years also had to be combined and renamed as “other plastics.” Finally, the category for “shredded paper in plastic bags” that was used in previous years was changed this year to include shredded paper in paper bags (the latter had previously been included in the “recyclable paper” category). No adjustments were possible to accommodate this change. The data for this year and the previous three years is shown in Tables 8 and 9. Figures 1 and 2 show this information as a percentage of the total amount of recyclables collected.

Table 8. Historical Composition Results for Single-Family Residuals

	End-of-Belt Residuals				Other Residuals			
	2016	2017	2018	2019	2016	2017	2018	2019
Acceptable Recyclable Mtls								
Paper	37.6	36.1	34.3	39.8	22.9	14.8	36.0	32.6
Plastic	17.5	11.4	18.8	17.4	4.3	4.1	1.1	5.2
Metals	1.6	1.5	2.7	0.9	1.4	0.9	1.1	0.7
Subtotal, Acceptable Mtls	56.7	49.1	55.8	58.1	28.5	19.8	38.2	38.5
Unacceptable Materials								
Paper	5.9	4.2	8.7	11.9	3.1	4.8	21.6	10.1
Shredded Paper, in bags	0	0	0	0	0.3	0	0	0.8
Shredded Paper, not bagged	0	0	0	0.3	0	0.4	0.2	0
Non-Recyclable Paper	5.9	4.2	8.3	11.5	2.7	4.1	17.6	8.4
Cardboard, Contaminated	0	0	0.4	0.2	0.1	0.3	3.9	0.9
Plastic	18.0	16.7	16.0	18.6	24.9	18.1	13.0	11.2
Plastic Packaging	11.3	9.3	7.8	13.2	4.3	5.0	3.6	3.9
Plastic Bags, Bagged	0	0	0	0.08	0.2	0	0.03	0.2
Plastic Bags, Loose Grocery	0.05	0	0.03	0.02	0.9	0.5	0.6	0.4
Plastic Bags, Loose Other	0.1	0.2	0.4	0.2	2.9	1.7	2.1	1.4
Plastic Film and Wrap	0.5	0.1	0.2	0.2	6.3	2.2	2.4	0.7
Other Plastics	5.1	6.8	7.4	4.3	10.2	8.5	4.1	4.4
Styrofoam	0.9	0.3	0.2	0.5	0.1	0.2	0.1	0.1
Non-Recyclable Metals	0.5	0.2	0.3	0.1	3.0	1.0	2.0	2.9
Glass (All Glass)	1.0	2.0	1.2	0.7	1.1	1.0	0.8	7.3
Other	17.8	27.8	18.0	10.6	39.4	55.3	24.4	30.1
Medical Waste, Medications	0.005	0.06	0.2	0.02	0	0	0.02	0.02
Medical Waste, Sharps	0.003	0	0	0	0	0.02	0	0
Batteries	0.2	0	0.05	0	0	0.2	0.1	0.04
Electronics	0.2	0.4	0.6	0.1	0.8	0	0.4	0.1
Food Waste	2.5	4.6	3.9	2.2	1.3	1.0	1.0	0.4
Yard Debris	0.3	0.2	0.1	0.2	2.7	0.1	0.1	0.1
Wood, C&D	2.6	2.7	3.4	1.4	1.6	5.0	6.7	2.0
Textiles	1.0	0.5	1.0	0.3	7.2	4.6	3.6	2.9
Garbage, Bagged	0	0	0	0	5.5	4.3	0.8	5.9
Fines	6.4	13.9	7.1	4.9	15.0	35.8	10.5	16.9
Other Wastes	4.6	5.5	1.7	1.6	5.2	4.3	1.1	1.7
Subtotal, Unacceptable Mtls	43.3	50.9	44.2	42.0	71.5	80.2	61.8	61.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

All figures are percentages by weight.

Table 9. Historical Composition Results for Multi-Family Residuals

	End-of-Belt Residuals				Other Residuals			
	2016	2017	2018	2019	2016	2017	2018	2019
Acceptable Recyclable Mtls								
Paper	31.9	35.8	37.3	42.2	13.7	21.8	28.8	31.7
Plastic	10.1	15.9	5.9	13.4	2.8	3.8	1.7	3.1
Metals	1.8	0.7	1.3	0.5	3.9	1.1	0.6	0.4
Subtotal, Acceptable Mtls	43.8	52.3	44.5	56.1	20.5	26.7	31.2	35.2
Unacceptable Materials								
Paper	10.9	5.1	15.1	11.6	5.3	6.0	21.5	20.7
Shredded Paper, in bags	0	0	0	0	0.3	1.0	0.04	0.1
Shredded Paper, not bagged	0	0	0.1	0	0	0.5	1.1	0
Non-Recyclable Paper	10.9	5.1	14.0	11.4	5.0	4.5	13.5	17.4
Cardboard, Contaminated	0	0	1.0	0.2	0	0	6.9	3.2
Plastic	24.9	14.4	19.4	19.3	16.5	15.4	12.3	11.5
Plastic Packaging	18.9	10.4	11.8	12.1	4.1	4.6	2.4	2.4
Plastic Bags, Bagged	0	0	0	0	0.4	0.2	0	0.05
Plastic Bags, Loose Grocery	0.03	0.04	0.03	0.01	1.0	1.0	0.9	1.0
Plastic Bags, Loose Other	0.1	0.2	0.1	0.2	1.0	1.6	1.0	1.6
Plastic Film and Wrap	0.2	0.4	0.5	0.1	2.4	2.8	1.6	1.8
Other Plastics	5.3	3.3	6.5	6.3	7.4	4.9	6.4	3.6
Styrofoam	0.5	0.2	0.4	0.5	0.3	0.3	0.1	0.2
Non-Recyclable Metals	0.1	0.8	0.1	0.2	0.3	1.1	0.6	0.9
Glass (All Glass)	1.2	5.0	1.3	1.8	2.3	3.6	0.8	4.8
Other	19.1	22.3	19.6	11.2	55.1	47.2	33.7	27.8
Medical Waste, Medications	0	0.1	0	0.02	0	0.1	0	0
Medical Waste, Sharps	0	0	0	0.02	0	0	0.02	0.02
Batteries	0	0.1	0.04	0	0.1	0.1	0.05	0.02
Electronics	0.6	0	0.5	0.2	0.2	0.1	0.3	0
Food Waste	2.4	3.8	5.9	2.6	0.3	0.6	1.0	1.0
Yard Debris	0.03	0.1	0.2	0.01	0.3	0	0.02	0.01
Wood, C&D	4.7	0.9	3.2	1.4	1.7	6.3	0.4	0.1
Textiles	3.0	0.8	1.5	1.3	8.2	3.5	2.4	2.6
Garbage, Bagged	0.7	0	0.1	0	2.7	2.1	3.3	0.9
Fines	5.2	14.3	7.5	5.1	39.1	33.9	24.9	22.3
Other Wastes	2.5	2.2	0.8	0.5	2.6	0.5	1.3	0.9
Subtotal, Unacceptable Mtls	56.2	47.7	55.5	43.9	79.5	73.3	68.8	64.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

All figures are percentages by weight.

Figure 1. Single-Family Residuals

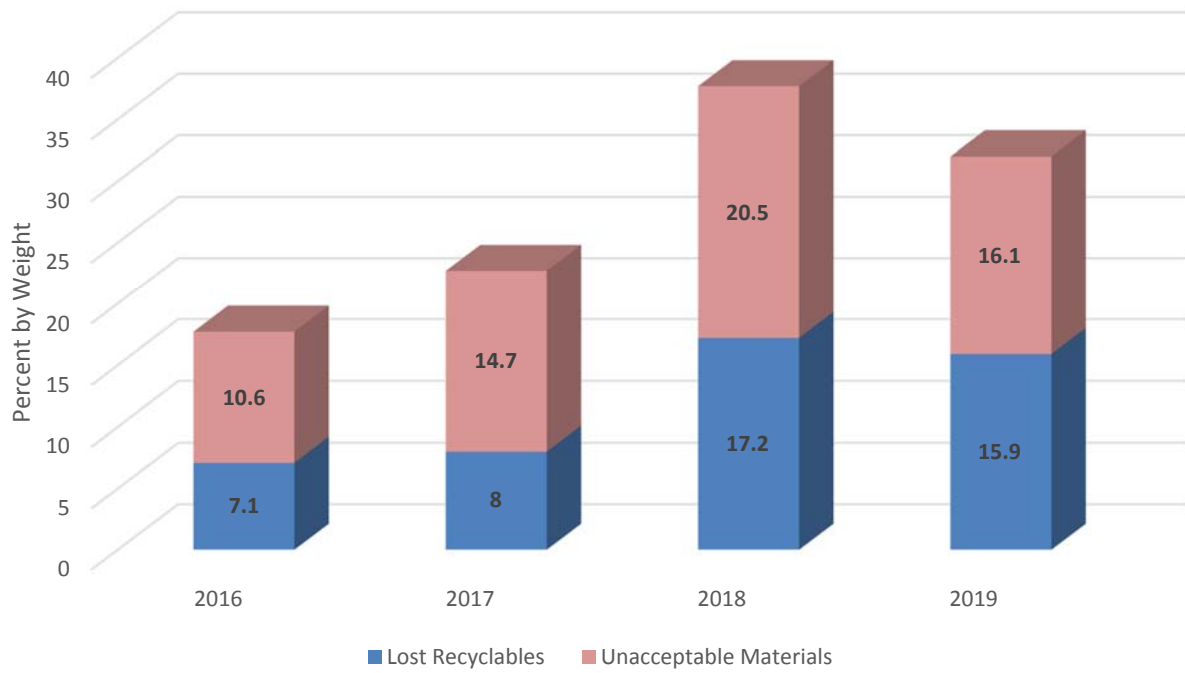
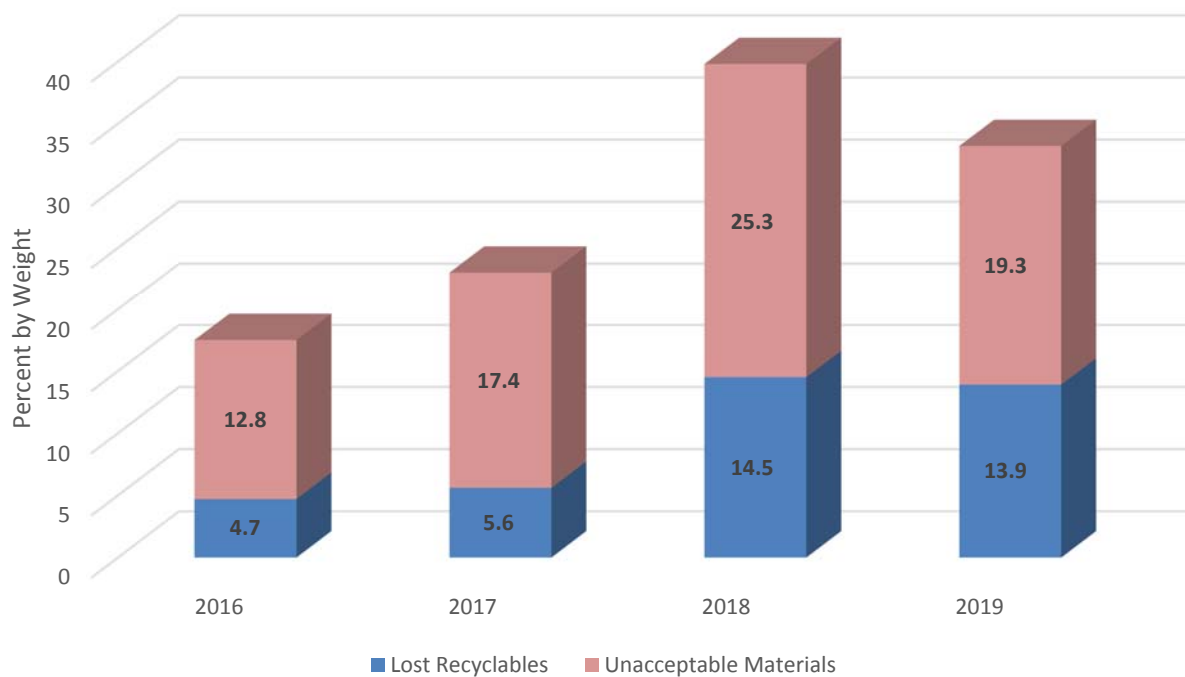


Figure 2. Multi-Family Residuals



**ATTACHMENT A
RESIDUALS USED FOR TESTING**

Photo A1: End-of-Belt Residuals from Single-Family Recyclables



Photo taken May 19, 2019. Photo shows end-of-belt residuals from processing single-family recyclables.

Photo A2: Other Residuals from Single-Family Recyclables



Photo taken May 19, 2019. Photo shows other residuals from processing single-family recyclables.

Photo A3: End-of-Belt Residuals from Multi-Family Recyclables



Photo taken May 12, 2019. Photo shows end-of-belt residuals from processing multi-family recyclables.

Photo A4: Other Residuals from Multi-Family Recyclables



Photo taken May 12, 2019. Photo shows other residuals from processing multi-family recyclables.

ATTACHMENT B
List of Materials for Sorting

TARGET RECYCLABLES	Paper – Magazines, Junk Mail, Phone Books, Paper Bags, Cereal Boxes, Gift and Shoe Boxes, Writing and Printing Paper, Newspaper, Cardboard
	Paper – Tetrapak, (milk cartons, drink boxes, soy milk, and soup/broth boxes)
	Plastic – Bottles, Tubs (no lids), Buckets (5-gallon or less), Nursery Pots (no dirt)
	Metal – Aluminum, Tin and Steel Cans, Aerosol Cans (empty, no lids), Other Metals (less than 35 pounds; no larger than 24 inches in any dimension; no plastic, rubber, or wood)
NON-TARGET (Contamination)	Paper – Shredded, in bags (note how many paper and how many plastic bags)
	Paper – Shredded, loose
	Paper – Non-Recyclable Paper (waxed, metal-lined, plastic-lined, wet-strength and frozen food packaging)
	Cardboard – Wet or contaminated (unclean pizza boxes, waxed, or painted)
	Plastic Packaging – Clamshells and Other Packaging (lids, blister packaging, and other rigid packaging)
	Plastic Bags – Bagged (plastic bag of plastic bags), count
	Plastic Bags – Loose Grocery and Retail Bags, count
	Plastic Bags – Loose, Other Bags, count
	Plastic – Film (not bags)
	Plastic – Other Plastics (rigid or non-rigid), describe
	Plastic – EPS (Styrofoam), including peanuts, block foam, and other
	Plastic – Non-Recyclable Bottles, including motor oil and pesticides
	Aerosol Cans – Not Empty (25% full or more)
	Metal – Non-Recy.(inc. appliances, other mixed metals, auto parts), and lids
	Glass – Recyclable and Non-Recyclable Glass
	Antifreeze – Used or New Antifreeze in Bottles
	Motor Oil – Oil in bottles
	Biological Waste – inc. diapers, feminine hygiene products, IV tubing, bloody gauze and animal wastes
	Medical Waste – Medications
	Medical Waste – Sharps
	Batteries – Bagged or Loose
	Electronics – Items with a circuit board, including mice
	Food Waste – Including packaging where greater than 50% of weight is food
	Yard Debris – Grass Clippings, Branches, Garden Waste, Houseplants, Flower Bouquets
	Wood and Construction/Demolition
	Textiles – Clothing, Bedding, Shoes, etc.
	Garbage – Bagged Garbage (must be checked, if a bag of recyclables then must be sorted and keep count of bags, if garbage then do not open)
	Fines – Materials that fall through screen
Other – Other non-target items	

**ATTACHMENT C
Sample Data Form**

Sample #: _____ Residual: End-of-Belt Source: SF MF Other Residuals		Date: _____ Time: _____
TARGET MATERIALS	WEIGHTS	COMMENTS
Paper, Recyclable		
Paper, TetraPak		
Plastics, Recyclable		
Metals, Recyclable		
NON-TARGET MATERIALS		
Shredded Paper, in bags		# bags, paper:___ plastic:___
Shredded Paper, Unbagged		
Non-Recyclable Paper		Save for sub-sort
Cardboard, contaminated		
Plastic Packaging		
Plastic Bags, bagged		Count bags of bags:
Plast. Bags, loose grocery/retail		Count bags:
Plastic Bags, loose other		Count bags:
Plastic Film/Wrap		
Other Plastics		
Plastic, Styrofoam		
Plastic, Non-Recyclable Bottles		
Aerosol Cans, not empty		
Non-Recyclable Metals		
Glass		
Antifreeze		Properly contained?
Motor Oil		
Biological Wastes		
Medical Waste, medications		
Medical Waste, sharps		
Batteries		Count bags:
Electronics		Describe:
Food Waste		
Yard Debris		
Wood, C&D		
Textiles		
Garbage, bagged		Count bags:
Fines		
Other		Describe:

ATTACHMENT D Sample Results

Single-Family (5-19-19) Sample Numbers:	End-of-Belt Residuals							Other Residuals							Residuals cut from Belts				
	1	Percent	2	Percent	3	Percent	Average	4	Percent	5	Percent	6	Percent	7	Percent	Average		Percent	
Target Materials																			
Paper, Recyclable	39.5	36.4%	41.6	37.5%	38.4	38.2%	37.4%	32	31.6%	40.6	37.5%	35.9	31.4%	30.1	29.3%	32.5%	6.96	14.2%	
Paper, Tetrapak	2.5	2.3%	3.1	2.8%	2.2	2.2%	2.4%	0.2	0.2%	0.04	0.0%	0.16	0.1%	0.02	0.0%	0.1%		0.0%	
Plastics, Recyclable	20.6	19.0%	17	15.3%	17.9	17.8%	17.4%	11.6	11.4%	4	3.7%	3.3	2.9%	3	2.9%	5.2%	0.84	1.7%	
Metals, Recyclable	0.96	0.9%	1	0.9%	0.82	0.8%	0.9%	0.56	0.6%	0.56	0.5%	0.94	0.8%	1	1.0%	0.7%	0.46	0.9%	
Non-Target Materials																			
Shredded Paper, in bags		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%	3.54	3.1%		0.0%	0.8%		0.0%	
Shredded Paper, Unbagged		0.0%		0.0%	0.9	0.9%	0.3%		0.0%		0.0%	0.12	0.1%		0.0%	0.0%		0.0%	
Non-Recyclable Paper	15.12	13.9%	9.14	8.2%	12.3	12.2%	11.5%	5.7	5.6%	8.7	8.0%	10.6	9.3%	10.9	10.6%	8.4%	3.4	6.9%	
Cardboard, contaminated	0.28	0.3%		0.0%	0.26	0.3%	0.2%	0.34	0.3%		0.0%	2.9	2.5%	0.6	0.6%	0.9%		0.0%	
Plastic Packaging	14.5	13.4%	14.5	13.1%	12.9	12.8%	13.1%	3.1	3.1%	4.8	4.4%	4	3.5%	4.4	4.3%	3.8%	0.1	0.2%	
Plastic Bags, bagged		0.0%		0.0%	0.24	0.2%	0.1%		0.0%	0.42	0.4%	0.32	0.3%		0.0%	0.2%		0.0%	
Plastic Bags, loose grocery	0.02	0.0%	0.02	0.0%	0.02	0.0%	0.0%	0.28	0.3%	0.54	0.5%	0.58	0.5%	0.5	0.5%	0.4%	0.7	1.4%	
Plastic Bags, loose other	0.26	0.2%	0.16	0.1%	0.14	0.1%	0.2%	2.5	2.5%	0.9	0.8%	1.6	1.4%	0.8	0.8%	1.4%	3.2	6.5%	
Plastic Film/Wrap	0.1	0.1%	0.2	0.2%	0.38	0.4%	0.2%	0.9	0.9%	0.65	0.6%	1	0.9%	0.65	0.6%	0.7%	0.68	1.4%	
Other Plastics	4.6	4.2%	5.8	5.2%	3.5	3.5%	4.3%	3.8	3.7%	6	5.5%	2.9	2.5%	6.1	5.9%	4.4%	3.86	7.9%	
Plastic, Styrofoam	0.8	0.7%	0.2	0.2%	0.7	0.7%	0.5%	0.04	0.0%	0.14	0.1%	0.1	0.1%	0.08	0.1%	0.1%		0.0%	
Plastic, Non-Recy. Bottles		0.0%	0.32	0.3%	0.12	0.1%	0.1%	0.3	0.3%		0.0%		0.0%		0.0%	0.1%		0.0%	
Aerosol Cans, not empty		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%	
Non-Recyclable Metals	0.28	0.3%	0.04	0.0%	0.02	0.0%	0.1%	0.9	0.9%	6	5.5%	4.1	3.6%	1.44	1.4%	2.9%	9.8	20.0%	
Glass	0.14	0.1%	1.82	1.6%	0.32	0.3%	0.7%	14.8	14.6%	1.8	1.7%	4.66	4.1%	9.08	8.8%	7.3%		0.0%	
Antifreeze		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%	
Motor Oil		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%	
Biological Wastes	0.42	0.4%	1.34	1.2%	0.06	0.1%	0.6%	0.14	0.1%	0.64	0.6%	0.52	0.5%	0.4	0.4%	0.4%		0.0%	
Medical Waste, medications	0.04	0.0%		0.0%	0.02	0.0%	0.0%		0.0%		0.0%		0.0%	0.1	0.1%	0.0%		0.00%	
Medical Waste, sharps		0.0%		0.0%		0.0%	0.0%		0.0%		0.00%		0.00%		0.0%	0.00%		0.0%	
Batteries		0.0%		0.0%		0.0%	0.0%		0.0%	0.12	0.1%		0.0%	0.06	0.06%	0.0%		0.0%	
Electronics		0.0%	0.08	0.1%	0.22	0.2%	0.1%		0.0%		0.0%		0.0%	0.56	0.5%	0.1%		0.00%	
Food Waste	2.7	2.5%	4.26	3.8%	0.3	0.3%	2.2%	0.08	0.1%	0.86	0.8%	0.46	0.4%	0.28	0.3%	0.4%		0.0%	
Yard Debris	0.02	0.02%	0.58	0.5%	0.04	0.0%	0.2%	0.05	0.0%		0.00%	0.08	0.07%	0.46	0.4%	0.1%		0.00%	
Wood, C&D	0.46	0.4%	3.18	2.9%	0.84	0.8%	1.4%	3.86	3.8%	0.64	0.6%	2.74	2.4%	1.4	1.4%	2.0%	0.14	0.3%	
Textiles	0.2	0.2%	0.1	0.1%	0.5	0.5%	0.3%	1.76	1.7%	5.22	4.8%	1.34	1.2%	4	3.9%	2.9%	18.8	38.4%	
Garbage, bagged		0.0%		0.0%		0.0%	0.0%	1.4	1.4%	13.6	12.6%	10	8.8%	0.96	0.9%	5.9%		0.0%	
Fines	4.3	4.0%	4.2	3.8%	7	7.0%	4.9%	16.9	16.7%	11.1	10.3%	22.3	19.5%	21.6	21.0%	16.9%		0.0%	
Other	0.62	0.6%	2.18	2.0%	0.54	0.5%	1.0%	0.14	0.1%	0.84	0.8%	0.08	0.1%	4.2	4.1%	1.3%		0.0%	
Totals (Pounds and Percent)	108.42	100.0%	110.82	100.0%	100.64	100.0%	100.0%	101.35	100.0%	108.17	100.0%	114.24	100.0%	102.69	100.0%	100.0%	48.94	100.0%	

Attachment D, Sample Results, continued

Multi-Family (5-12-19) Sample Numbers:	End-of-Belt Residuals							Other Residuals							Residuals cut from Belts			
	1	Percent	2	Percent	3	Percent	Average	4	Percent	5	Percent	6	Percent	7	Percent	Average	8	Percent
Target Materials																		
Paper, Recyclable	44.6	40.9%	30.3	37.7%	30.2	35.3%	38.0%	27.8	36.6%	39.3	38.3%	27.5	27.6%	21.6	23.6%	31.5%	5	5.0%
Paper, Tetrapak	4.4	4.0%	3.7	4.6%	3.5	4.1%	4.2%		0.0%	0.24	0.2%	0.3	0.3%	0.16	0.2%	0.2%		0.0%
Plastics, Recyclable	15.1	13.8%	12.3	15.3%	9.5	11.1%	13.4%	5.96	7.8%	2.2	2.1%	1.1	1.1%	1.1	1.2%	3.1%		0.0%
Metals, Recyclable	0.52	0.5%	0.34	0.4%	0.44	0.5%	0.5%	0.06	0.1%	0.34	0.3%	0.48	0.5%	0.54	0.6%	0.4%		0.0%
Non-Target Materials																		
Shredded Paper, in bags		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%	0.28	0.3%	0.08%		0.0%
Shredded Paper, Unbagged		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%
Non-Recyclable Paper	13.1	12.0%	11.8	14.7%	6.5	7.6%	11.4%	15.8	20.8%	19	18.5%	14.8	14.8%	14.2	15.5%	17.4%		0.0%
Cardboard, contaminated		0.0%		0.0%	0.5	0.6%	0.2%	0.52	0.7%	5	4.9%	2.8	2.8%	4.2	4.6%	3.2%		0.0%
Plastic Packaging	15.1	13.8%	10.3	12.8%	7.72	9.0%	11.9%	1.7	2.2%	3.3	3.2%	1.52	1.5%	2.3	2.5%	2.4%		0.0%
Plastic Bags, bagged	0	0.0%		0.0%		0.0%	0.0%	0.04	0.1%	0.1	0.1%		0.0%	0.06	0.07%	0.05%		0.0%
Plastic Bags, loose grocery	0.02	0.0%	0.02	0.02%		0.0%	0.01%	1	1.3%	1.1	1.1%	0.7	0.7%	0.7	0.8%	1.0%	10	10.0%
Plastic Bags, loose other	0.16	0.1%	0.42	0.5%	0.04	0.0%	0.24%	1.1	1.4%	2	2.0%	1.9	1.9%	1.1	1.2%	1.6%	20	20.0%
Plastic Film/Wrap	0.14	0.1%	0.02	0.0%	0.02	0.0%	0.06%	0.9	1.2%	2.32	2.3%	2	2.0%	1.5	1.6%	1.8%	50	50.0%
Other Plastics	5.82	5.3%	4.78	5.9%	6.54	7.6%	6.3%	4.12	5.4%	4.4	4.3%	1.32	1.3%	3.2	3.5%	3.6%	10	10.0%
Plastic, Styrofoam	0.7	0.6%	0.4	0.5%	0.2	0.2%	0.5%	0.2	0.3%	0.2	0.2%	0.2	0.2%	0.2	0.2%	0.2%		0.0%
Plastic, Non-Recy. Bottles	0.44	0.4%	0.06	0.1%		0.0%	0.2%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%
Aerosol Cans, not empty		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%
Non-Recyclable Metals	0.4	0.4%	0.16	0.2%		0.0%	0.2%	0.48	0.6%	0.58	0.6%	1.42	1.4%	0.74	0.8%	0.9%		0.0%
Glass	0.62	0.6%	0.34	0.4%	3.72	4.4%	1.8%	2.5	3.3%	4.2	4.1%	5.36	5.4%	6	6.6%	4.8%		0.0%
Antifreeze		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%
Motor Oil		0.0%		0.0%		0.0%	0.0%		0.0%		0.0%		0.0%		0.0%	0.0%		0.0%
Biological Wastes	0.46	0.4%	0.1	0.1%	0.48	0.6%	0.4%	0.24	0.3%	1.16	1.1%	1.12	1.1%	0.16	0.2%	0.7%		0.0%
Medical Waste, medications		0.0%	0.04	0.0%		0.0%	0.02%		0.0%		0.0%		0.0%		0.0%	0.0%		0.00%
Medical Waste, sharps		0.0%		0.0%	0.05	0.1%	0.02%		0.0%		0.0%	0.02	0.02%	0.05	0.1%	0.02%		0.0%
Batteries		0.0%		0.0%		0.0%	0.0%	0.02	0.03%		0.0%		0.0%	0.04	0.0%	0.02%		0.0%
Electronics	0.56	0.5%		0.0%	0.18	0.2%	0.2%		0.0%		0.0%		0.0%		0.0%	0.0%		0.00%
Food Waste	0.94	0.9%	0.78	1.0%	5.22	6.1%	2.6%	0.88	1.2%	1.28	1.2%	0.6	0.6%	0.96	1.0%	1.0%		0.0%
Yard Debris		0.0%	0.02	0.0%		0.0%	0.01%		0.0%	0.04	0.0%		0.0%		0.00%	0.01%		0.00%
Wood, C&D	1.06	1.0%	0.24	0.3%	2.4	2.8%	1.4%		0.0%	0.2	0.2%	0.04	0.04%		0.0%	0.06%		0.0%
Textiles	0.52	0.5%	0.9	1.1%	2	2.3%	1.3%	2.24	2.9%	1.24	1.2%	3.22	3.2%	2.58	2.8%	2.6%	5	5.0%
Garbage, bagged		0.0%		0.0%		0.0%	0.0%		0.0%	1.58	1.5%	1.52	1.5%	0.66	0.7%	0.9%		0.0%
Fines	4	3.7%	3.4	4.2%	6.3	7.4%	5.1%	10.2	13.4%	12.7	12.4%	31.6	31.7%	29	31.7%	22.3%		0.0%
Other	0.46	0.4%		0.0%		0.0%	0.14%	0.2	0.3%		0.0%	0.26	0.3%	0.18	0.2%	0.2%		0.0%
Totals (Pounds and Percent)	109.12	100.0%	80.42	100.0%	85.51	100.0%	100.0%	75.96	100.0%	102.48	100.0%	99.78	100.0%	91.51	100.0%	100.0%	100	100.0%

ATTACHMENT E

Statistical Certainty of Results

A. INTRODUCTION

There is a quantifiable degree of error associated with the composition results shown in this report, and this error can be expressed in terms of confidence intervals. This attachment shows the confidence intervals for the composition results.

B. METHODOLOGY

This study was designed to provide accurate data on the composition of several types of residuals. As with all sampling projects and surveys, there is a quantifiable amount of potential error in the results. The amount of error, or “uncertainty,” associated with the results can be calculated based on the sample results.

For this type of study, the statistical certainty of the results can be expressed using confidence intervals. Confidence intervals are the range of values for which one can be confident (to a given degree, such as 90% confident) that the true value falls within. The confidence limits are also sometimes shown as a “plus or minus value.” For example, this study shows that the amount of recyclable paper in the Single-Family end-of-belt (EOB) residuals is 37.4%, with a lower and upper confidence limit of 35.9% and 38.8%, respectively. This is based on a confidence interval of 90%, so that in this example one can be 90% confident that the true value for recyclable paper falls between 35.9% and 38.8%.

Due to the relatively small sample size (only three or four samples for each type of residual), the confidence intervals have been calculated using a t-distribution approach. This approach generally leads to slightly wider confidence intervals than other, more straightforward calculations of confidence intervals.

C. RESULTS

The following table shows the confidence limits associated with the results for each source. As can be seen in the table, many of the confidence intervals are relatively narrow, indicating fairly consistent results for the various samples. In general, the confidence intervals are narrower for the materials found in larger quantities (above about 3%) in these tests. Materials found only sporadically or inconsistently, such as wood and C&D materials, have wider confidence intervals due to their variability.

Table E-1, Statistical Certainty of Results

Target Materials	Single-Family						Multi-Family					
	EOB	LCL	UCL	Other	LCL	UCL	EOB	LCL	UCL	Other	LCL	UCL
Paper, Recyclable	37.4%	35.9%	38.8%	32.5%	28.3%	36.6%	38.0%	33.3%	42.7%	31.5%	23.2%	39.9%
Paper, Tetrapak	2.4%	1.9%	3.0%	0.1%	0.0%	0.2%	4.2%	3.7%	4.8%	0.2%	0.0%	0.3%
Plastics, Recyclable	17.4%	14.2%	20.5%	5.2%	0.4%	10.1%	13.4%	9.8%	17.0%	3.1%	0.0%	6.9%
Metals, Recyclable	0.9%	0.8%	0.9%	0.7%	0.5%	1.0%	0.5%	0.4%	0.5%	0.4%	0.1%	0.6%
Non-Target Materials												
Shredded Paper, in bags	0.0%	0.0%	0.0%	0.8%	0.0%	2.6%	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%
Shredded Paper, Unbagged	0.3%	0.0%	1.2%	0.03%	0.00%	0.09%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-Recyclable Paper	11.5%	6.5%	16.4%	8.4%	5.9%	10.9%	11.4%	5.4%	17.4%	17.4%	14.2%	20.7%
Cardboard, contaminated	0.2%	0.0%	0.4%	0.9%	0.0%	2.2%	0.2%	0.0%	0.8%	3.2%	1.0%	5.5%
Plastic Packaging	13.1%	12.6%	13.6%	3.8%	3.1%	4.6%	11.9%	7.6%	16.2%	2.4%	1.5%	3.2%
Plastic Bags, bagged	0.1%	0.0%	0.3%	0.17%	0.0%	0.4%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Plastic Bags, loose grocery	0.02%	0.02%	0.02%	0.4%	0.3%	0.6%	0.01%	0.00%	0.04%	1.0%	0.6%	1.3%
Plastic Bags, loose other	0.2%	0.1%	0.3%	1.4%	0.4%	2.3%	0.2%	0.0%	0.7%	1.6%	1.2%	2.1%
Plastic Film/Wrap	0.2%	0.0%	0.5%	0.7%	0.6%	0.9%	0.1%	0.0%	0.2%	1.8%	1.2%	2.3%
Other Plastics	4.3%	2.8%	5.8%	4.4%	2.6%	6.3%	6.3%	4.3%	8.3%	3.6%	1.6%	5.7%
Plastic, Styrofoam	0.5%	0.0%	1.1%	0.1%	0.0%	0.1%	0.5%	0.1%	0.8%	0.2%	0.2%	0.3%
Plastic, Non-Recy. Bottles	0.1%	0.0%	0.4%	0.1%	0.0%	0.2%	0.2%	0.0%	0.5%	0.0%	0.0%	0.0%
Aerosol Cans, not empty	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Non-Recyclable Metals	0.1%	0.0%	0.3%	2.9%	0.3%	5.4%	0.2%	0.0%	0.5%	0.9%	0.4%	1.3%
Glass	0.7%	0.0%	2.1%	7.3%	0.6%	14.0%	1.8%	0.0%	5.5%	4.8%	3.1%	6.5%
Antifreeze	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Motor Oil	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Biological Wastes	0.6%	0.0%	1.6%	0.4%	0.2%	0.6%	0.4%	0.0%	0.7%	0.7%	0.1%	1.3%
Medical Waste, medications	0.02%	0.00%	0.05%	0.02%	0.0%	0.08%	0.02%	0.00%	0.06%	0.0%	0.0%	0.0%
Medical Waste, sharps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.02%	0.00%	0.08%	0.02%	0.00%	0.05%
Batteries	0.0%	0.0%	0.0%	0.04%	0.00%	0.11%	0.0%	0.0%	0.0%	0.02%	0.00%	0.04%
Electronics	0.1%	0.0%	0.3%	0.1%	0.0%	0.5%	0.2%	0.0%	0.7%	0.0%	0.0%	0.0%
Food Waste	2.2%	0.0%	5.2%	0.4%	0.0%	0.7%	2.6%	0.0%	7.7%	1.0%	0.7%	1.4%
Yard Debris	0.2%	0.0%	0.7%	0.1%	0.0%	0.4%	0.01%	0.00%	0.03%	0.01%	0.00%	0.03%
Wood, C&D	1.4%	0.0%	3.6%	2.0%	0.4%	3.7%	1.4%	0.0%	3.5%	0.1%	0.0%	0.2%
Textiles	0.3%	0.0%	0.6%	2.9%	0.9%	4.9%	1.3%	0.0%	2.9%	2.6%	1.5%	3.6%
Garbage, bagged	0.0%	0.0%	0.0%	5.9%	0.0%	12.6%	0.0%	0.0%	0.0%	0.9%	0.1%	1.8%
Fines	4.9%	1.9%	7.9%	16.9%	11.3%	22.5%	5.1%	1.7%	8.5%	22.3%	9.5%	35.1%
Other	1.0%	0.0%	2.4%	1.3%	0.0%	3.5%	0.1%	0.0%	0.6%	0.2%	0.0%	0.3%
	100.0%			100.0%			100.0%			100.0%		

Notes: EOB = end-of-belt residuals, LCL = lower confidence limit, UCL = upper confidence limit, and Other = other residuals.