

Material Recovery Facility Waste Characterization Study Report

October 30, 2018

STATEMENT OF WORK

Bridging The Gap (BTG), a 501c3 environmental organization, assisted the Johnson County Department of Health and Environment (JCDHE) in performing a solid waste characterization study of the Waste Management (WM) material recovery facility (MRF) at 2404 S 88th St, Kansas City, KS servicing Johnson County, KS customers. The purpose of the study is to determine the composition and quantity of materials being recycled by type (aluminum, steel, cardboard, office paper, plastic, etc.) and contaminants by type by single family residential generators. The study results will be used to assess the efficacy of the Johnson County Solid Waste Management Plan and strategic planning for future solid waste initiatives.

SUMMARY

The total sample size was 1,433.50 pounds, of which recycling amounted to 1,053.80 pounds, non-detrimental contaminants weighed 205.70 pounds and detrimental contaminants weighed 174.00 pounds. The recycling facility audit indicated that 26.49% of the Johnson County residential curbside recycling stream was contamination, the majority of which was bagged recycling (10.33%) and contaminated paper (6.72%).

The audit identified opportunities to decrease contamination and increase recycling, i.e. educate on not bagging recycling and recycling glass, plastic film and textiles at appropriate locations. This would decrease the contamination rate to 13.32%.

METHODOLOGY

JCDHE, BTG and WM agreed to schedule the audit before the fall holidays began as to avoid samples that could represent atypical generation habits which would create a misrepresentation of the quantity and composition of the feedstock. Additionally, and similarly to when curbside audits are performed, advance notice to program participants was avoided to prevent behavioral change. WM agreed to collect two rear-load truckloads from residential routes occurring on Monday from two different cities within Johnson County, but one truck deposited the recycling load in the wrong location where it was unable to be sampled. Therefore, all samples were taken from one truckload. Because the audit was performed inside the MRF, all staff and volunteers were required to wear safety vests, glasses, hard hats and appropriate clothing and footwear. The volunteers were divided into two groups and sorted three



FIGURE 1 - PICTURE OF LOAD SAMPLE BEFORE AUDIT

samples each. The samples were taken from the top, sides and the inside or bottom of the load to guarantee a good mixture of all areas of the route.



FIGURE 2 - SAMPLE BEING DEPOSITED ONTO SORTING TABLE

The audit was conducted the morning of Tuesday, October 30 by 10 staff and three volunteers and took approximately 4 hours. The audit was supervised by Julie Davis with JCDHE, Michelle Martin with WM and Cassandra Ford with BTG.

BTG prepared the tracking spreadsheet based on contaminants found during Johnson County's curbside recycling audit as well as The

Recycling Partnership's MRF audit checklist. Samples were sorted into recyclable categories of cardboard (OCC), paper, aluminum/steel and plastic (PET #1, HDPE #2, PP #5); non-detrimental contaminant categories of contaminated paper, glass, scrap metal, organics (food, yard waste), EPS (Styrofoam in any form), all non-recyclable plastics, construction & demolition, electronics and other (residuals off table/floor); and detrimental contaminant categories of bagged recycling, plastic film, wrapables (hoses, cords), textiles, sharps and hazardous waste. All materials were sorted into a large Rubbermaid can or a small Rubbermaid tote. Samples were weighed and recorded into the proper category on the spreadsheet. The tare weights for each sorting container were subtracted during the calculation process.



FIGURE 3 - RECYCLING SAMPLE



FIGURE 4 - PERFORMING AUDIT

ANALYSIS

The total sample size was 1,433.50 pounds, of which recycling amounted to 1,053.80 pounds, non-detrimental contaminants weighed 205.70 pounds and detrimental contaminants weighed 174.00 pounds. This amounts to a MRF contamination rate of 26.49%. The contaminants were categorized as detrimental and non-detrimental based on their impact on the safety and efficiency of MRF operations. Plastic film and wrapables don't weigh as much as glass but can cause hours per day of downtime while equipment is being cleaned.

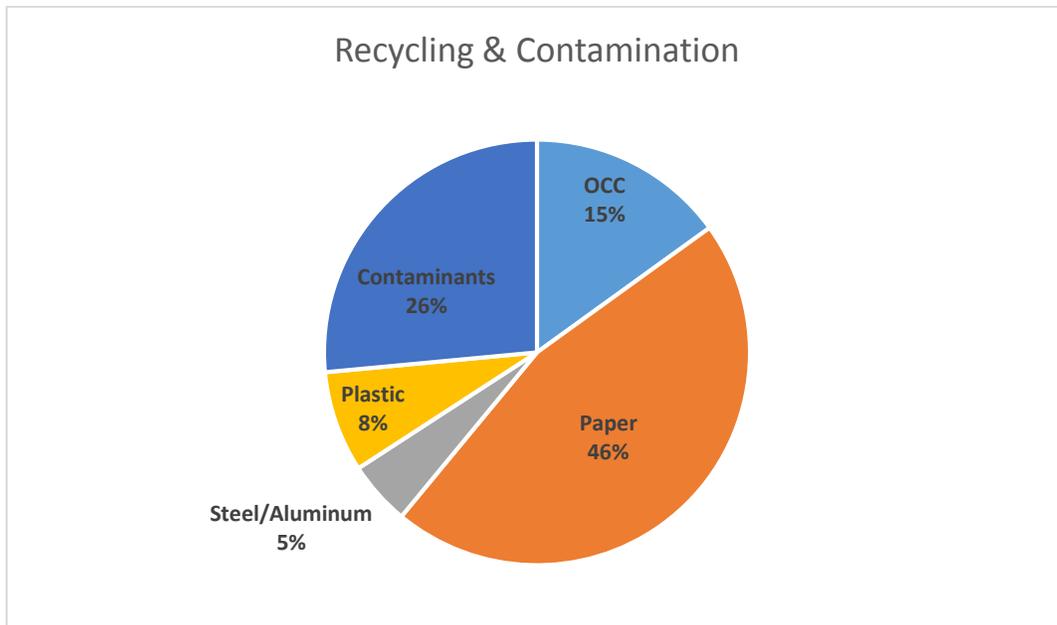


FIGURE 5 - CHART SHOWING PERCENTAGE OF RECYCLABLES AND CONTAMINATION

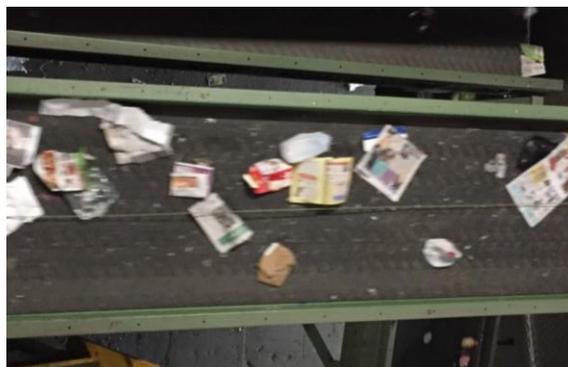


FIGURE 6 - ROPE HUNG UP IN SORTING EQUIPMENT DURING AUDIT

A total of 379.70 pounds of contaminants were found within the recycling sample sorted, of which 217.7 pounds could have been recycled if they had not been bagged or if they had been taken to the proper location (i.e. glass drop off, textiles to thrift store, etc.) instead of being included into the co-mingled

curbside stream (represented in blue on the graph below). If those materials had been unbagged and or recycled correctly through drop off locations, the curbside contamination rate would have been 13.32%.

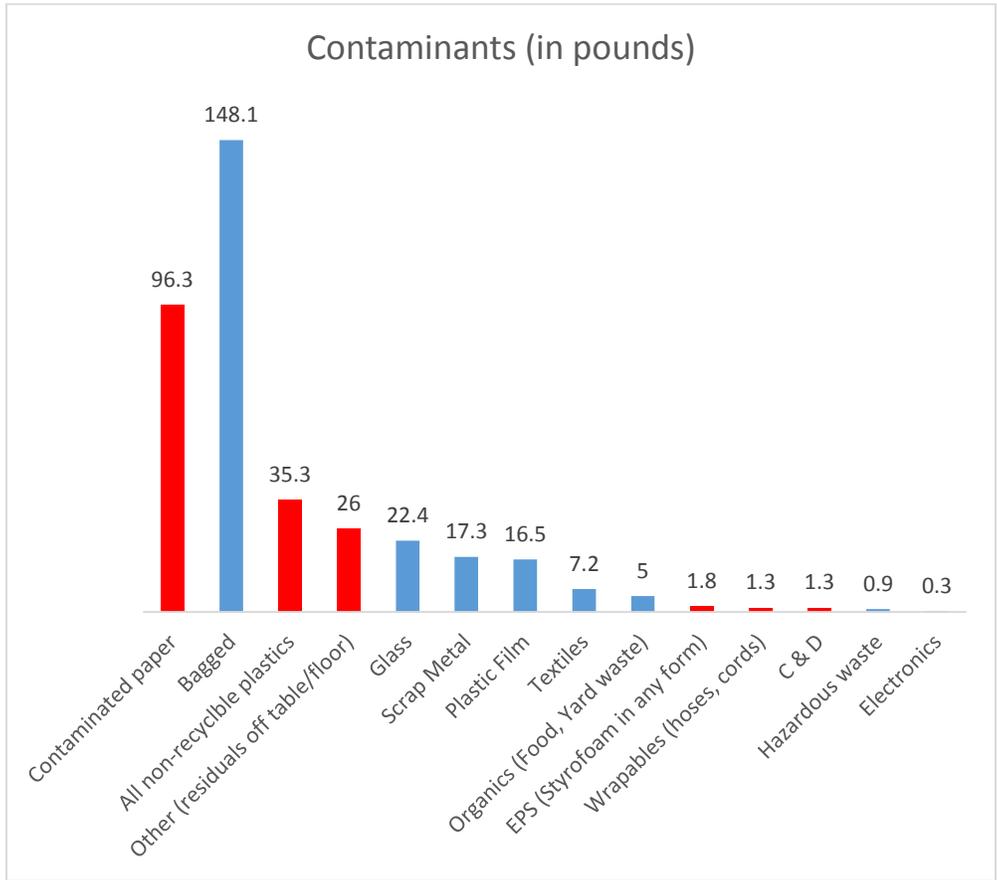


FIGURE 7 - CHART SHOWING TYPES OF CONTAMINANTS BY WEIGHT



FIGURE 8 - CONTAMINATED PAPER



FIGURE 9 - PLASTIC FILM



FIGURE 10 - NON-RECYCLABLE PLASTIC



FIGURE 11 - BAGGED RECYCLING

STATISTICAL ANALYSIS/ RECOMMENDATIONS

The JCDHE/BTG/WM MRF audit revealed contamination types consistent with national recycling markets in the US, as you can see from the lists below.

Johnson County audit results

(in order based on % found in recycling audit)

- Bagged recycling
- Contaminated paper
- All non-recyclable plastics
- Other (residuals off table/floor)
- Glass
- Scrap metal
- Plastic film
- Textiles
- Organics (food, yard waste, liquids)
- EPS (Styrofoam in any form)
- Wrapables (hoses, cords)
- Construction & demolition
- Hazardous waste
- Electronics

National common contaminant list

(in no particular order)

- Bagged recycling
- Contaminated paper
- All non-recyclable plastics
- Scrap metal
- Plastic film
- Textiles
- Organics (food, yard waste, liquids)
- EPS (Styrofoam in any form)
- Wrapables (hoses, cords)
- Construction & demolition
- Electronics

The two largest contaminants in the Johnson County audit by weight were bagged recycling and contaminated paper. JCDHE has already been working on an education campaign to reduce the prevalence of bagged recycling and bags/plastic film in the recycling stream. This messaging needs to be increased to make residents aware of the damaging impacts and frequency of occurrence. The second largest contaminant, contaminated paper, should be addressed next, but will be difficult to educate on due to its subjectivity. Residents need to know that food-contact paper (frozen food packaging, napkins, paper plates/cups, and tissues) and all paper pieces smaller than a playing card are not recyclable.

Also, JCDHE should increase general recycling education to help eliminate the “contaminants” in the curbside bins that can be recycled elsewhere, including glass, plastic film, textiles, electronics, hazardous waste and yard waste. As mentioned previously, this would help eliminate approximately half of the current contamination. The general education would also help increase the recycling of acceptable materials. As seen in the graph below, Johnson County falls below the national average in recycling cardboard and paper and aluminum and steel. These are highly recyclable commodities and should be captured in the recycling stream.

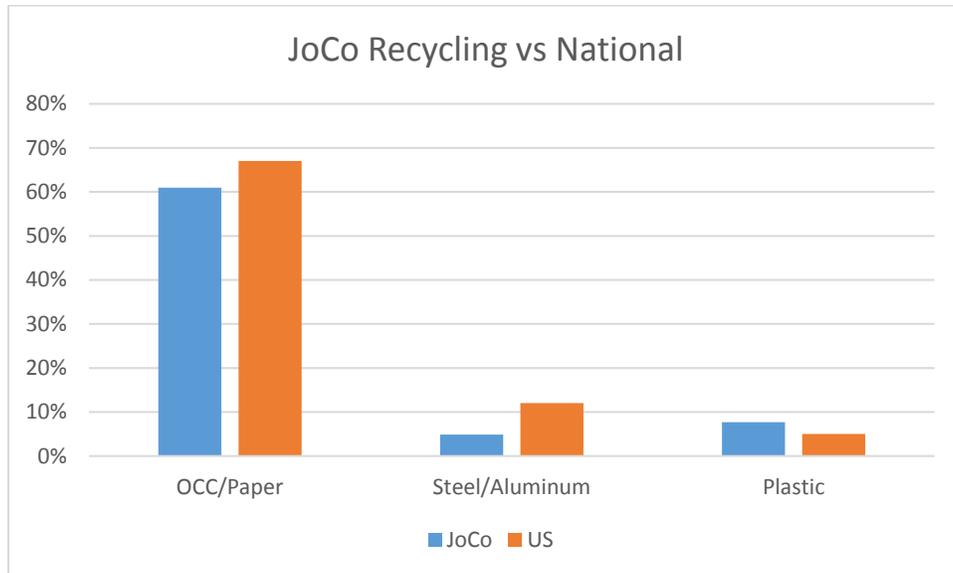


FIGURE 12 - CHART SHOWING PERCENTAGE OF RECYCLING IN JOHNSON COUNTY AND US, BY PERCENTAGE AND COMMODITY TYPE

CONCLUSION

Johnson County residents are doing a respectable job of putting what they believe to be acceptable materials into the curbside recycling stream, but more education is needed regarding what is acceptable within the plastics and paper streams. A contamination rate of 26% is not conducive for the long-term viability of the recycling program.