Making MRF Audits Routine

Lessons Learned to Reduce Costs
and Standardize Data Management

CT DEEP SOLID WASTE ADVISORY COMMITTEE

OCTOBER 23, 2018
Introduction

- Collection Optimization
- SWMP/Zero Waste
- Procurement Support
- Cost/Rate Studies
- Recycling/Organics

Material Characterization

Note: Florida and Pennsylvania statewide studies were performed by key MSW staff while working for prior employers.
Minimizing contamination and maximizing yields of targeted recyclables has never been more important in the Recycling Industry!

- Light-weighting of valuable commodities
- Increasing diversity of packaging and labeling
- Increasing contamination in cart-based systems
- China National Sword
Determining Recycling Composition

- Typical audit: Once per year (if you are lucky)
  - Collaborate with supplier and processor to define material categories
  - Select 15 to 50 loads of single stream recyclables
  - Take grab samples
  - Sort into targeted commodities and problem materials
  - Use a spreadsheet to perform a specialized statistical analysis
Recycling Audit Resource Needs and Costs

$$$

### Table

```
<table>
<thead>
<tr>
<th>Sample ID</th>
<th>R001</th>
<th>R002</th>
<th>R003</th>
<th>R005</th>
<th>R010</th>
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<tr>
<td>Compounds/Other</td>
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<td>0.2</td>
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<td>0.2</td>
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<td>SubTotal</td>
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<td>10.2</td>
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</tbody>
</table>
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### Images

1. Workers sorting recyclables in a facility.
2. A truck loaded with recyclables.
3. A spreadsheet showing resource needs and costs.

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Who is Auditing their Recyclables?

- New York City
- Philadelphia
- Miami
- Charlotte, NC
- Arlington County, VA

What do these local governments have in common?

...large populations and high recycling tonnage

...processing contracts that share revenues based on underlying commodity values
 Connecticut Local Government Suppliers

- 169 cities and towns
- 2017 average population of 21,000

Assuming excellent recycling participation...
- 400 lbs/household recycled
- 1,500 tons of curbside recycling
  - $75,000 commodity value at $50/ton

*It often does not make economic sense for small municipalities to fund a recycling composition audit*
Connecticut Single Stream Recycling Composition

- Recyclable Paper: 54.6%
- Glass Bottles: 9.3%
- Broken Glass: 7.9%
- Plastic Bottles: 4.9%
- Other Recyclable Plastic: 2%
- Aseptic/Cartons: 0.4%
- Steel Cans: 1.7%
- Aluminum Cans: 0.6%
- Contaminants: 18.2%

Source: 2015 Connecticut Statewide Waste Characterization
## Audit Results

### Calculated Value

Calculated Value

$70/ton

<table>
<thead>
<tr>
<th>Group</th>
<th>Material</th>
<th>Percent</th>
<th>Market Value ($/Ton)</th>
<th>Weighted Value ($/Ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>Corrugated Cardboard</td>
<td>28.9%</td>
<td>$81.25</td>
<td>$23.48</td>
</tr>
<tr>
<td></td>
<td>Residential Mixed Paper</td>
<td>19.6%</td>
<td>$50.31</td>
<td>$9.86</td>
</tr>
<tr>
<td></td>
<td>Aseptic Packaging and Gable-Top Cartons</td>
<td>0.3%</td>
<td>$113.75</td>
<td>$0.36</td>
</tr>
<tr>
<td>Plastic</td>
<td>#1 PET Plastics</td>
<td>4.2%</td>
<td>$274.40</td>
<td>$11.41</td>
</tr>
<tr>
<td></td>
<td>#2 HDPE Plastics Natural</td>
<td>1.0%</td>
<td>$618.80</td>
<td>$6.12</td>
</tr>
<tr>
<td></td>
<td>#2 HDPE Plastics Colored</td>
<td>1.3%</td>
<td>$503.20</td>
<td>$6.31</td>
</tr>
<tr>
<td></td>
<td>#4, #5, #7 Plastics</td>
<td>0.6%</td>
<td>$0.40</td>
<td>$0.00</td>
</tr>
<tr>
<td></td>
<td>Bulky Rigid Plastics</td>
<td>3.0%</td>
<td>$5.00</td>
<td>$0.15</td>
</tr>
<tr>
<td>Glass</td>
<td>Glass Bottles and Broken Glass</td>
<td>17.7%</td>
<td>-$15.50</td>
<td>-$2.75</td>
</tr>
<tr>
<td>Metal</td>
<td>Aluminum Beverage Cans &amp; Trays</td>
<td>1.2%</td>
<td>$1,315.00</td>
<td>$15.19</td>
</tr>
<tr>
<td></td>
<td>Steel/Aerosol Cans</td>
<td>1.2%</td>
<td>$53.75</td>
<td>$0.66</td>
</tr>
<tr>
<td>Contamination</td>
<td></td>
<td>18.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case Study: Recycling Composition Fluctuates!!

- Corrugated Cardboard
- Mixed Paper
- Plastic Bottles
- Glass
- Contaminants

May-August 2015
May 2016
August 2016
October 2016
April 2017
July 2017
October 2017
March 2018
Is there a better way to audit recyclables?

SEEKING FEEDBACK FROM CITIES, TOWNS AND PROCESSORS
Challenges to Measuring Composition

- Appropriate sampling protocols
- Sorting equipment
- Data management
- Cost for third parties
- Trained personnel to conduct tests
How can audits be easier, cheaper, better?

- **Prerequisite**: Consensus between suppliers and processors that ongoing composition and contamination monitoring is valuable
  ...

- Collaboratively developed audit protocol that meets technical standards

- Web-based data management platform
  - Upload and analyze audit data
  - Store pictures of inspected loads and/or audited samples
  - Share data with processor and supplier in real time
The Grading and Purity (GAP) System

- Customized Audit Protocol
- Specified Equipment for sorting, weighing, and data recording
- Cloud Based Data Management
- Composition, Market Value & Contamination Report for You / for Your Supplier
All data is provided numerically and graphically. You may download your data into a spreadsheet at any time. Built-in queries provide you with the composition based on any grouping you need to evaluate the material quality. Analyze the composition by individual commodity, or view the level of contamination, or create a custom view to meet your needs.
If you provide the tonnage of material, the system applies the composition estimates and current RecyclingMarkets.net commodity pricing to calculate the value per ton of the audited material stream.
You can also back-calculate the value of the audited material stream for the preceding three years based on RecyclingMarkets.net historical pricing.
Pictures can be browsed and downloaded for each sample or load. The *Wastelnsight™* team can help develop customized reports that combine data and photos.
A Guide to Recycling

Connecticut now has a universal list of what belongs in your recycling bin and what doesn’t. All items should be empty, rinsed, clean and open. Do not shred, box, bag or bundle. To learn more, go to RecycleCT.com

<table>
<thead>
<tr>
<th><strong>What’s IN?</strong></th>
<th><strong>What’s OUT?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PAPER</strong></td>
<td></td>
</tr>
<tr>
<td>Cardboard &amp; boxboard</td>
<td>Gift wrap &amp; gift bags</td>
</tr>
<tr>
<td>Food &amp; beverage cartons</td>
<td>Ice cream containers</td>
</tr>
<tr>
<td>Junk mail</td>
<td>Paper cups (hot &amp; cold)</td>
</tr>
<tr>
<td>Magazines &amp; newspaper inserts</td>
<td>Shredded paper</td>
</tr>
<tr>
<td>Newsprint</td>
<td>Take-out food containers</td>
</tr>
<tr>
<td>Office paper</td>
<td>Tissue paper</td>
</tr>
<tr>
<td>Pizza boxes</td>
<td></td>
</tr>
<tr>
<td><strong>GLASS</strong></td>
<td></td>
</tr>
<tr>
<td>Beverage bottles &amp; jars</td>
<td>Ceramic mugs &amp; plates</td>
</tr>
<tr>
<td>Food bottles &amp; jars</td>
<td>Drinking glasses</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>METAL</strong></td>
<td></td>
</tr>
<tr>
<td>Aerosol containers (food grade only)</td>
<td>Aerosol containers (deodorizers, cleaners, pesticides, etc.)</td>
</tr>
<tr>
<td>Aluminum foil</td>
<td>Foil tops from yogurt containers</td>
</tr>
<tr>
<td>Cans &amp; bottles</td>
<td>Paint cans</td>
</tr>
<tr>
<td>Foil containers</td>
<td>Pots &amp; pans</td>
</tr>
</tbody>
</table>
Feedback Requested

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(407) 380-8951
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jculbertson@wasteinsight.net
Auditing System in Action