COMBATING CONTAMINATION in Recycling

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ReCommunity Recycling
CONTAMINATION ON THE RISE

% Contamination

- MAR-12
- MAY-12
- JUL-12
- SEP-12
- NOV-12
- JAN-13
- MAR-13
- MAY-13
- JUL-13
- SEP-13
- NOV-13
- JAN-14
- MAR-14
- MAY-14
- JUL-14
- SEP-14
- NOV-14
- JAN-15
- MAR-15
- MAY-15
- JUL-15
- SEP-15
- NOV-15
- JAN-16

10.0% 11.0% 12.0% 13.0% 14.0% 15.0% 16.0% 17.0% 18.0%
THE LOADS COMING IN NOW AVERAGE 16% CONTAMINATION

— WASTE MANAGEMENT SUSTAINABILITY REPORT (2014)
CONTAMINATION ON THE RISE, WHY?

- Wishful Recycling, especially plastic
- Prevalence of new packaging
- Carelessness
- Lack of education/knowledge
- Out of sight, Out of mind – automated collections
- Complicated and differing guidelines and labeling for recycling programs
PLASTIC BAGS ARE A MULTI-MILLION DOLLAR PROBLEM
DANGEROUS CONTAMINATION

• Risk to Employees
  • Medical wastes – diapers, syringes, fluids, risk of blood borne pathogens
  • Hazardous materials and chemicals – solvents, pool chemicals, HHW that makes it into recycling
  • Explosion and fire hazards – propane cylinders, gas cans, ammunition, batteries
  • Cut/puncture hazards – needles, knives, scrap metal
DANGEROUS CONTAMINATION

• Risk to Plant Equipment
  • Appliances
  • Auto parts
  • Construction debris
  • Wires, hoses, cables, chains
  • Textiles and clothing, carpet
  • Tarps, swimming pools
FOOD WASTE

CARELESSNESS
SQUEEZED FROM BOTH SIDES

INBOUND CONTAMINATION

MRF

COMMODITY MARKETS

$ QUALITY DEMANDS
CONTAMINATION = PROBLEMS

More contamination means:

- Material ending up in landfill anyway
- Collateral damage
- Increased risk of employee injury – must be removed by hand.
- Each 1% of contamination = 20,000 pieces of trash removed by hand each day per MRF
- Gets jammed in machinery – down time and repairs
  - Plastic bags, ropes, wires wrap around rotating equipment
  - Cleaning plastic bags from machinery costs over $200,000 per year/MRF
  - Potential damage to equipment from non program material
- Efficiency of operation decreases
INCREASED CONTAMINATION

More contamination also means:

• Higher operating costs
• Higher residue disposal costs
• Less commodities recovered per ton
• Less revenue
• Literally throwing money away
WHAT CAN MRF’S DO ABOUT CONTAMINATION

- Updated equipment to keep outbound material as clean as possible
- Clearly define what’s acceptable in the program for clients
- Provide resources and support for recycling programs
- Communicate with clients about issues as much as possible
- Tip floor inspections-Inspect loads as they come in to narrow down the source
REDUCING CONTAMINATION AT THE SOURCE

• What tip-floor inspections lack when identifying contamination:
  o There are anywhere between 400-600 collection points that may be included in a single load of residential recyclables
  o Contamination comes from a variety of sources that can’t be pinpointed once at the MRF
  o MRFs want to please the customer, which can lead to complacency

How can we get a handle on the problem when:
  o The client can’t hire more inspectors
  o Drivers can’t inspect containers while in the truck
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

Contamination seen seconds after being dumped into a truck through the dash-mounted Hopper Camera.
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

• What is needed
  o A tool to reduce or eliminate barriers to tracking and communicating with contaminators
  o A tool that will mimic the idea of an open-bin system within an automated collection system
  o Substantially cheaper than hiring more inspectors and investing in expensive equipment

MOBILE WORKFORCE APPLICATION
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

Mobile 311 App – Custom Screens
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

- Mobile Workforce
- Customizable App
- Cloud Data Hosting
- Custom Website
- Customizable Data
- Work order System
- Enables GIS analysis
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

• What does this mean?
  o Information can be recorded in the field very quickly using custom buttons for particular workflow
  o Work orders automatically emailed to assigned staff person
  o No pen and paper, calls or verbal communication is needed
  o Instantly accessible data stored in the cloud
  o Quick data analysis to identify repeat contaminators
  o Downloadable data compatible with Excel and GIS
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

- City of Greensboro Case Study
  - Studying potential impacts of implementing Mobile 311 system as part of Vehicle Operator duties and/or as a potential inspection technique for a passenger in a collection vehicle
  - Studied contamination within four routes known to have high levels of contamination in the City for three months
  - Focused on well-known worst areas for contamination
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

• Parameters

<table>
<thead>
<tr>
<th>Contamination Type Designations</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
<td>More than 10 incorrect items but less than 15% by volume contamination. User may have attempted to recycle but intent is unclear.</td>
</tr>
<tr>
<td>Severe</td>
<td>More than 15% contaminated or with one or more non-program items that shows extreme negligence such as MSW, special waste (such as yard waste, tires, electronics, HHW), or items particularly damaging to ReCommunity such as hoses, organics, etc.</td>
</tr>
<tr>
<td>Skips/Pre-Service Inspection</td>
<td>An incorrect item is visible sticking out of the top of the recycling container that indicates negligence on the part of the user</td>
</tr>
<tr>
<td>Full Opaque Bag</td>
<td>Full non-transparent or black trash bags are present, contents are unknown</td>
</tr>
</tbody>
</table>
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

- Results

![Chart 1: # of Flags by Work Type](chart.png)

- Heavy Contamination: 724
- Medium Contamination: 139
- Opaque Bag: 1131
- Skip Container: 158
MOBILE TOOLS FOR REDUCING CONTAMINATION AT THE SOURCE

- Results over 6 service days

30% households flagged once, approximately 1 out of 3

22% households flagged twice, approximately 1 out of 5

11% households flagged three or more times, approximately 1 out of 10
### Results

<table>
<thead>
<tr>
<th>Route #</th>
<th>Repeaters- 2 times</th>
<th>% of total</th>
<th>Repeaters 3 times +</th>
<th>% of total</th>
<th>Total % Repeaters</th>
<th>% Stops Tagged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday Blue</td>
<td>85</td>
<td>14%</td>
<td>36</td>
<td>6%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Friday Blue</td>
<td>84</td>
<td>14%</td>
<td>62</td>
<td>11%</td>
<td>24%</td>
<td>25%</td>
</tr>
<tr>
<td>Thursday Red</td>
<td>85</td>
<td>16%</td>
<td>43</td>
<td>8%</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>Friday Red</td>
<td>65</td>
<td>15%</td>
<td>24</td>
<td>5%</td>
<td>20%</td>
<td>21%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>319</strong></td>
<td><strong>14%</strong></td>
<td><strong>165</strong></td>
<td><strong>7%</strong></td>
<td><strong>22%</strong></td>
<td><strong>22%</strong></td>
</tr>
</tbody>
</table>