2009 Connecticut State-wide Municipal Solid Waste Disposal Composition and Characterization Study

Prepared for:
State of Connecticut, Department of Environmental Protection Bureau of Materials Management & Compliance Assurance/Solid Waste Management Program

Prepared by:
- DSM Environmental Services, Inc.
- Cascadia Consulting Group
- MidAtlantic Solid Waste Consultants

Final Report: April 30, 2010
Plan serves as the basis for Connecticut’s solid waste management decision making through 2024

Plan has a target of a 58% Municipal Solid Waste (MSW) diversion rate by the year 2024; current diversion rate is 30%

Strategy 6-7 of the Plan required CTDEP to conduct a solid waste characterization study for the purpose of better targeting waste disposal diversion efforts

CTDEP initiated the first ever Connecticut statewide MSW characterization study in 2009
Objectives of the Study

- Develop waste composition data that is statistically representative of the State’s generated Municipal Solid Waste (MSW) disposed at permitted solid waste management facilities
- Quantify the estimated weight of each material type disposed at permitted solid waste management facilities
- Separately quantify waste composition from Residential and Institutional/Commercial/Industrial (ICI) sources
Objectives of the Study (continued)

- Identify potentially recoverable recyclable and compostable materials found in the disposed MSW stream that could be targeted to meet Plan diversion goal.
- Improve existing solid waste programs and plan for the types of facilities that may be needed.
- Design the study so that it can be replicated at a future date.
Participating Facilities

- **Bristol Resource Recovery Facility (RFF):** 650 ton per day (TPD) mass burn RRF located in Bristol, CT; Owned and operated by Covanta Bristol, Inc.; 16 municipalities deliver waste to this facility

- **CRRA Mid-CT Project (Hartford) RDF:** 2850 TPD refuse derived fuel (RDF) facility operated by CRRA, resulting fuel conveyed to an adjacent power plant operated by Covanta; accepts waste from 70 municipalities

- **CRRA Southeast Project (Preston) RRF:** 690 TPD mass burn RRF facility serving communities in southeastern CT around Preston, CT; CRRA owns this facility which is operated by Covanta

- **New Haven Municipal Transfer Station:** 700 TPD facility accepting MSW and C&D wastes; owned by the New Haven Solid Waste and Recycling Authority; privately operated (under contract)

- **Wheelabrator Bridgeport RRF:** 2250 TPD mass burn RRF owned and operated by Wheelabrator Bridgeport, L.P. serving the greater Bridgeport area
Participating Facilities

Bristol Resource Recovery Facility (RFF)

CRRA Mid-CT Project (Hartford) RDF

Wheelabrator Bridgeport RRF

New Haven Municipal Transfer Station

CRRA Southeast Project (Preston) RRF
Definition of Waste Sectors

- **Residential** – waste brought to permitted solid waste facilities by commercially or municipally operated vehicles, in which 80% or more of the waste is from single family and/or multi-family residential sources.

- **Institutional/Commercial/Industrial (ICI)** – waste brought to permitted facilities by commercially operated vehicles, in which 80% or more of the waste is from ICI sources. Excludes Construction and Demolition debris, as well as bulky waste.

- **Unacceptable loads** – loads that contain less than 80% of either residential or ICI wastes, and loads originating from outside of Connecticut.
Study Design

- Statistically valid sampling
  - 98 Residential waste samples
  - 160 Industrial/Commercial/Institutional (ICI) samples
- Conducted over two seasons
  - February/March, 2009
  - October, 2009
- Random selection of trucks at each facility
- Random selection of sample from truck load
- Sorted into 68 material categories
Material Categories

- Paper - 9 subsets
- Plastic - 14 subsets
- Metal - 8 subsets
- Glass - 5 subsets
- Organics - 6 subsets
- Construction and Demolition - 8 subsets
- Household Hazardous Waste (HHW) - 9 subsets
- Electronics - 4 subsets
- Other Wastes - 5 subsets
### Material Categories (continued)

Excerpt from the Hand-sort Tally Sheet:

<table>
<thead>
<tr>
<th>Paper</th>
<th>Organics (wood, yard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCC/Kraft Paper</td>
<td>Food Waste</td>
</tr>
<tr>
<td>Offshore Cardboard</td>
<td>Branches &amp; Stumps</td>
</tr>
<tr>
<td>High Grade Office Paper</td>
<td>Prunings &amp; Trimmings</td>
</tr>
<tr>
<td>Magazines/Catalogs</td>
<td>Leaves &amp; Grass</td>
</tr>
<tr>
<td>Newsprint</td>
<td>Manures</td>
</tr>
<tr>
<td>Phone Books &amp; Directories</td>
<td>R/C Organic</td>
</tr>
<tr>
<td>Other Recyclable Paper</td>
<td>Construction and Demolition</td>
</tr>
<tr>
<td>Compostable Paper</td>
<td>Asphalt, Brick, &amp; Concrete</td>
</tr>
<tr>
<td>R/C Paper</td>
<td>Wood - Treated</td>
</tr>
<tr>
<td></td>
<td>Wood - Untreated</td>
</tr>
<tr>
<td></td>
<td>Asphalt Roofing</td>
</tr>
<tr>
<td>Plastic</td>
<td>Drywall/Gypsum Board</td>
</tr>
<tr>
<td>PET Bottles/Jars (non-haz)</td>
<td>Carpet</td>
</tr>
<tr>
<td>PET Containers-non bottles (non-haz)</td>
<td>Carpet Padding</td>
</tr>
<tr>
<td>Plastic CT Dep. Bev. Containers</td>
<td>R/C C&amp;D</td>
</tr>
<tr>
<td>HDPE Bottles (non-haz)</td>
<td>Household Hazardous Waste</td>
</tr>
<tr>
<td>HDPE Containers other than Bottles</td>
<td>Ballasts, CFLs, &amp; Other FLs</td>
</tr>
<tr>
<td>Plastic Containers #3-#7 (non-haz)</td>
<td>Batteries - Lead Acid</td>
</tr>
<tr>
<td>Expanded Poly. Non-Food Grade</td>
<td>Other Batteries</td>
</tr>
<tr>
<td>Expanded Poly. Food-grade</td>
<td>Paint</td>
</tr>
<tr>
<td>Durable Plastic Items</td>
<td>Sharpsh</td>
</tr>
<tr>
<td>Film</td>
<td>Vehicle &amp; Equipment Fluids</td>
</tr>
<tr>
<td>Grocery/Merchandise Bags</td>
<td>Empty Metal, Glass, &amp; Plastic Cont. (Haz)</td>
</tr>
<tr>
<td>Other Film</td>
<td>Pesticides &amp; Fertilizers</td>
</tr>
<tr>
<td>Pallets - Plastic</td>
<td></td>
</tr>
<tr>
<td>R/C Plastic</td>
<td></td>
</tr>
</tbody>
</table>
Composition of each sample represents the ratio of each material weight to the total weight of the sample.

Sample composition averaged across all samples to derive state-wide waste composition, by percentage for each material.

Composition percentages applied to total Residential and total ICI waste tonnage to estimate total weight of each material disposed in CT waste stream (Overall statewide = 44% ICI and 56% Residential).
Samples Waiting to be Sorted
Residents and ICI disposed of 2,380,000 tons (rounded) of MSW in Calendar Year 2009

~ 80% of the Overall disposed MSW stream was accounted for under the major material categories:

- *Organics* at ~ 27% (~623,000 tons);
- *Paper* at ~ 26% (~617,000 tons);
- *Construction and Demolition* at ~ 14% (~335,000 tons);
- *Plastics* at ~ 15% (~350,000 tons)

(Note: % is by weight)
# Most Common Materials, by Weight

State-wide Disposed MSW, 2009

<table>
<thead>
<tr>
<th>Material</th>
<th>Overall Percent</th>
<th>Residential Percent</th>
<th>ICI Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Waste</td>
<td>13.5%</td>
<td>13.7%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Compostable Paper</td>
<td>8.2%</td>
<td>9.8%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Leaves &amp; Grass</td>
<td>7.2%</td>
<td>10.7%</td>
<td>2.9%</td>
</tr>
<tr>
<td>OCC/Kraft Paper</td>
<td>5.8%</td>
<td>2.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Wood - Treated</td>
<td>4.7%</td>
<td>3.8%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Durable Plastic Items</td>
<td>3.6%</td>
<td>2.8%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Other Recyclable Paper</td>
<td>3.6%</td>
<td>4.2%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Other Film</td>
<td>3.5%</td>
<td>3.9%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Carpet</td>
<td>3.5%</td>
<td>4.0%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Remainder/Composite (R/C) Organic</td>
<td>3.2%</td>
<td>4.0%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Wood - Untreated</td>
<td>2.7%</td>
<td>0.5%</td>
<td>5.4%</td>
</tr>
<tr>
<td>(R/C) Plastic</td>
<td>2.4%</td>
<td>2.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Prunings &amp; Trimmings</td>
<td>2.2%</td>
<td>3.1%</td>
<td>1.0%</td>
</tr>
<tr>
<td><strong>Sum of Percents</strong></td>
<td><strong>64.1%</strong></td>
<td><strong>65.2%</strong></td>
<td><strong>62.7%</strong></td>
</tr>
</tbody>
</table>
Overall Composition of Statewide Disposed MSW

- Paper: 25.9%
- Plastic: 14.7%
- Metals: 4.5%
- Glass: 2.1%
- Organics: 26.7%
- Construction and Demolition: 14.1%
- Household Hazardous Waste: 0.5%
- Electronics: 2.1%
- Other Waste: 9.3%
- Plastic: 14.7%
- Metals: 4.5%
- Glass: 2.1%
- Other Waste: 9.3%
- Paper: 25.9%
State-wide Residential Disposed MSW Waste, 2009

- **Paper**: 25.2%
- **Plastic**: 12.9%
- **Metals**: 4.6%
- **Glass**: 2.2%
- **Organics**: 32.1%
- **Construction and Demolition**: 10.6%
- **Household Hazardous Waste**: 0.4%
- **Electronics**: 2.0%
- **Other Waste**: 10.1%
- **Plastic**: 12.9%
- **Metals**: 4.6%
- **Glass**: 2.2%
State-wide Institutional/Commercial/Industrial (ICI) Disposed MSW, 2009

- Paper: 26.8%
- Plastic: 16.9%
- Metals: 4.5%
- Glass: 2.0%
- Organics: 19.9%
- Construction and Demolition: 18.5%
- Household Hazardous Waste: 0.8%
- Electronics: 2.3%
- Other Waste: 8.3%
- Electronics: 2.3%
- Other Waste: 8.3%
Recommendations for Future Waste Composition and Characterization Studies

- Work toward an improved system of tracking and reporting amounts of Residential versus Institutional/Commercial/Industry (ICI) MSW disposed.
- Conduct future waste characterizations on a 7 - 10 year cycle to monitor significant changes in composition.
- Materials categories should remain as close to the ones used in the current Study as possible to assure comparable data.
- Consider more targeted generator samples from different types of commercial establishments.
- Include composition of materials recycled through Connecticut permitted Intermediate Processing Centers.
Contact Information

- CTDEP website (Final Report and related documents): http://www.ct.gov/dep

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  http://www.dsmenvironmental.com
Funding for this study was provided by the State Solid Waste Fund administered by the Connecticut Department of Environmental Protection (DEP)

Study could not have been conducted without the cooperation of the following:
- Bristol Resource Recovery Facility and Covanta
- CRRA Mid-CT Project (Hartford) and Covanta
- CRRA Southeast Project (Preston) and Covanta
- New Haven Solid Waste and Recycling Authority
- Wheelabrator Bridgeport, L.P.