Executive Summary -
National Mixed Rigid Plastic Bale Composition Study &
Analysis of Non-Bottle Rigid Plastic Available for Recycling

Fall 2011

Overview of the APR Rigid Plastics Recycling Committee

The Association of Post Consumer Plastics Recyclers (APR), North America’s largest alliance of plastics reclaimer, represents companies totaling over 94% of the post-consumer plastic recycling processing capacity. APR is constantly seeking new ways to strengthen the economically viable and environmentally responsible recycling of post-consumer plastics.

In 2008 APR created the Rigid Plastics Recycling Program to increase the recycling rate of rigid plastics beyond #1 and #2 bottles. Rigid plastic recycling “stakeholders” - collectors, recyclers, brand users, resin producers and public policy makers - are openly discussing the issues, concerns and problems towards creating non-bottle rigid plastic recycling solutions. A national approach to rigid plastic recycling, collection infrastructure for rigid plastics, and the availability of post consumer polypropylene recycled resin are some of the long term goals of the program.

Purpose of Study

This study was undertaken to determine the composition of the various types of mixed rigid plastic bales generated in North America and to provide a theoretical estimate of the volume and type of non-bottle rigid plastic available for recycling. Making more accurate estimates of the types, volume and destination of rigid plastic waste currently are recycled, and understanding the type and tonnage of rigid plastic available for recycling in North America will strengthen and advance non-bottle rigid recycling.

Overview of Study

Moore Recycling Associates and the APR Rigid Plastic Recycling Committee have identified seven distinct types of mixed resin bales being produced in North America that contain non-bottle rigid plastic – 1. All Rigid, 2. Bottles & Containers Bale, 3. Prepicked Bale, 4. Small Containers Bale, 5. Tub & Lids Bale, 6. Bulky Rigid, 7. Olefin Bale. Using these seven bale types as a base, twenty nine bales were sorted from 24 MRFs located on the West Coast, East, Midwest and Canada. In addition, other bales which contained non-bottle rigid plastics and became available to the “team” were also sorted. Before the bales were sorted they were photographed and weighed. In total, between product categories and resin type, baled material was divided into 82 sorts. All percentages in report are based on weight.
Results of Bale Sort

The study showed that Household Container bales and Bulky Rigid bales have the lowest contamination levels and recover the most plastic.

Although regional differences can make a difference, the study concluded that the greatest impact on bale quality and composition of recovered plastics is material recovery facilities (MRF) practices, such as how they sort the plastics (categories, technology, positive or negative) and how well MRFs sort the plastics (capacity vs. flow-through, management priorities).

Metal contamination in the bales was minimal. The highest on average was 2% in the PrePicked bales. However, Bulky Rigid and Oelfin bales have bucket handles, component screws and toy and electronic components that make up the majority of the attached metal.

1. **All Rigid Bale** –
   **Definition** - From MRFs that combine all bottles, containers and bulky plastics into a single bale. Bales contain: all non-bottle containers, bulky rigid plastic, and all bottles.

   **Sort Results** - *By product category* the highest component is bulky items, followed by bottles. *By resin type* the greatest component is PE, followed by PP, PET and HDPE.

2. **Bottles & Containers Bale** –
   **Definition** - From MRFs that mix plastic bottles and containers together, but do not have—or separately bale—bulky rigid plastics. Bales contain: all bottles and containers, but no bulky rigid plastic.

   **Sort Results** - *By product category*, on average, approximately 75% of this bale type was bottles and 12 % was trash. The *highest resin type* was PET followed by HDPE.

3. **Prepicked Bale** –
   **Definition** - From MRFs that pull PET and HDPE bottles and bale all remaining rigid plastics. Bales contain: all non-bottle containers, bulky rigid plastic, and very few bottles.

   **Sort Results** – The *highest product category* was bulky items, followed by trash. The *highest resin type* was PE, followed by PP and HDPE.

4. **Small Containers Bale** –
   **Definition** – From MRFs that pull PET and HDPE bottles and bale all remaining plastic bottles and containers together, but do not have—or separately bale—bulky rigid plastic. Bales contain: all plastic containers, very few bottles and no bulky rigid plastic.
Sort Results – The highest product category was Flats/Thermoforms, followed by containers. The highest resin type was PP followed by PET.

5. **Tubs and Lids Bale**
   **Definition** - From MRFs that service Tubs & Lids programs. Bales contain: PP, PE household, non-bottle containers including buckets.

   **Sort Results** – The highest product category was containers followed by buckets. The highest resin type was HDPE followed by PP.

6. **Bulky Rigid Bale**
   **Definition** – From MRFs that pull large plastic items, usually at the front end. Bales contain: all large items predominantly PE and PP.

   **Sort Results** – The highest product category was bulky items followed by buckets. The highest resin type was PE followed by PP.
7. **Olefin Bale**

**Definition** – From MRFs that pull PET and HDPE bottles, then mixed olefin plastics. Bales contain: PE and PP bottles, PE and PP non-bottle containers, and PE and PP bulky rigid plastic.

**Sort Results** – The *highest product category* was bulky items followed by nursery pots. The *highest resin type* was PP followed by PE.

**Results of Analysis of Non-Bottle Rigid Plastic Available for Recycling**

To determine the current availability of non-bottle rigid plastic for recycling, EPA categories of information by resin type were compared to eleven states “Waste Characterization Studies”. However, in comparing these sources of information, there was considerable discrepancy in the data. For example, the EPA has 12 pounds per person in the total PET packaging category, yet the state average is 24 pounds with a range of 11 to 52. Waste Analysis studies represent a tradeoff between available funding and comprehensiveness. Competing issues and interest impact the date that is produced. If a case can be made that sufficient buyers and demand exists to buy non-bottle rigid plastic, then perhaps future EPA and states studies will research more discrete categories.

*The full 77 page study is available to purchase from the APR. It contains a breakout of each type of bale, sorted by product and resin categories and shows average percentage of each category in the bale as well as data from two specific bales sorted. In addition, Appendix’ includes detailed sort data broken down both by bale type/product category and by bale type/resin. Report also includes information on five additional bale types which were sorted – Colored HDPE bottles with Olefin containers, Mixed PP, Mixed HDPE, All Rigid with Film, and Residual.*