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**2006 REPORT ON POST CONSUMER  
PET CONTAINER RECYCLING ACTIVITY**

**FINAL REPORT**

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**INTRODUCTION**

2006 marks the twelfth year that NAPCOR has issued this report in its current format.<sup>1</sup> 2006 also marks the second year that the National Association for PET Container Resources (NAPCOR) and The Association of Post Consumer Plastic Recyclers (APR) have worked together to produce this report. Without APR's support and the cooperation of its members, this report would not have been possible. As such, it is intended to provide the reader with a detailed overview of the recycling of injection stretch blow molded PET containers in the United States during 2006. Information contained in this report was obtained through surveys conducted by R.W. Beck and Moore Recycling Associates, combined with data generated internally by NAPCOR, the PET Resin Association (PETRA), and this year, the International Bottled Water Association (IBWA). In order to present as accurate a picture of these activities as possible, additional data and information were obtained through discussions with individual collectors, intermediate processors, reclaimers, converters, brokers, exporters, resin producers, bottle manufacturers, public recycling officials, consultants and key industry members.

**PET BOTTLES AVAILABLE FOR COLLECTION**

Growth of PET bottles and jars in the market was mixed during 2006. Double-digit growth continued for the packaging of still water (including flavored and vitamin water) and isotonic drinks, complemented by new growth in the tea and energy drink market segments. This was somewhat offset by slippage in the sales of carbonated soft drinks (csd) as all of the major beverage producers voluntarily agreed in May to halt soda sales to public schools throughout the country. This brought to a close a very aggressive era of vending machine placements and growth, not solely associated with sales, but with the inventory requirements as well. In addition, the huge amounts of bottled water produced and distributed in response to the hurricanes and storms of 2005 were, thankfully, not necessary in 2006. 2006 also saw the first use in the US of PET for bulk beer packaging as Foster's of Australia began shipping its product in the PET "Ecokeg." Accordingly, the market growth for PET bottles and jars for sale in the US was about 6.9%.

NAPCOR has determined that the total number of pounds of PET bottles and jars available in the United States for recycling in 2006 was 5.424 billion. This number reflects the total amount of PET bottle resin used by U.S. bottle manufacturers from U.S., foreign, and recycled sources; less scrap generated and not reused, exported bottles and pre-forms, and bottles less than eight ounces in size. This number is used in this report as the denominator in determining both the recycling and utilization rates.

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<sup>1</sup> Some of the charts and tables in this report will only address the last 10 years. Those who are interested in data from previous years can access it in the 2005 Report, available at [www.napcor.com/reports.htm](http://www.napcor.com/reports.htm).

**POST CONSUMER PET BOTTLE PURCHASES**

The amount of post consumer PET bottles collected for recycling and sold in the U.S. was 1.272 billion pounds in 2006. The breakdown of categories in millions of pounds is as follows:

619	- Purchased by U.S. Reclaimers
618	- Purchased by Export Markets
35	- PET bottle component of mixed bales exported
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1,272	- Total Amount of Post Consumer Bottles (mmlbs)

For the third straight year, the post-consumer PET bottle recycling rate has increased. As in 2005, the increase can be partially attributed to a number of factors, including:

- A 42 mmlb increase in California collections
- The incremental increase from additional bottle sales
- The installation of an additional 26 autosort units at MRFs and IPCs
- Additional new commercial recovery efforts

Unfortunately, the additional volumes collected were all exported, primarily to China. While U.S. reclaimers reported a drop in purchases of US bottles by 62 mmlbs from 2005, export purchases jumped 170 mmlbs to 618 mmlbs not including the PET fraction in mixed bottle bales. Destinations for this material included China, Canada, Vietnam and India among others.

In turn, U.S. reclaimers continued to supplement their domestic purchases by importing 97 mmlbs in 2006, with 40.5 mmlbs from Canada, 36.8 mmlbs from Mexico, and the balance coming from Central and South America. Almost 59% of these imports were in the form of dirty flake. In addition, U.S. reclaimers reported purchasing 57 mmlbs of alternative feedstock, including pre-consumer bottles, post consumer strapping, and other unprocessed industrial scrap. All total, U.S. reclaimers purchased a total of 772 mmlbs, down 65 mmlbs from the record level of 837 mmlbs purchased in 2005. This can be directly attributed to the closing of two reclamation plants, Wellman and SE PET Resin Recyclers.

2006 again saw an amount of PET bottles exported as part of mixed bottle bale shipments with a significant fraction of the total going to India. By definition, PET bottles comprise a minimum of 40% of these bales by weight and contributed to slightly more than 35 mmlbs of PET bottles sold in this form. The small amount of dirty PET flake used directly in applications without being cleaned was included this year in the U.S. reclaimer purchases total.

<b>POST CONSUMER BOTTLES</b>										
<u>Gross Weight Purchases (mmlbs.)</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
A. Purchased by U.S. Reclaimers	580	656	588	599	600	522	520	631	681	619
B. Purchased by Exporters *	111	89	183	170	234	275	321	372	489	653
C. Total U.S. Material Recycled (A+B)	<b>691</b>	<b>745</b>	<b>771</b>	<b>769</b>	<b>834</b>	<b>797</b>	<b>841</b>	<b>1,003</b>	<b>1,170</b>	<b>1,272</b>
D. Post Consumer Bottle Imports	66	101	60	69	70	57	62	106	109	97
E. Total Post Consumer Bottles used by U.S. Reclaimers (A+D)	<b>646</b>	<b>757</b>	<b>648</b>	<b>668</b>	<b>670</b>	<b>579</b>	<b>582</b>	<b>737</b>	<b>790</b>	<b>716</b>

\* The 2006 number includes 35 mmlbs of PET sold in mixed bottle bale shipments.

**2005 GROSS RECYCLING RATE**

Total U.S. Bottles Collected and Sold for Recycling = 1,272 mmlbs.  


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= **23.5%**  
Total U.S. Bottles Available for Recycling = 5,424 mmlbs.

<b>Year</b>	<b>Total U.S. Bottles Collected (mmlbs.)</b>	<b>Bottles on U.S. Shelves (mmlbs.)</b>	<b>Gross Recycling Rate</b>
<b>1995</b>	775	1,950	39.7%
<b>1996</b>	697	2,198	31.7%
<b>1997</b>	691	2,551	27.1%
<b>1998</b>	745	3,006	24.8%
<b>1999</b>	771	3,250	23.7%
<b>2000</b>	769	3,445	22.3%
<b>2001</b>	834	3,768	22.1%
<b>2002</b>	797	4,007	19.9%
<b>2003</b>	841	4,292	19.6%
<b>2004</b>	1,003	4,637	21.6%
<b>2005</b>	1,170	5,075	23.1%
<b>2006</b>	1,272	5,424	23.5%

**PET BOTTLE BALE MARKETS**

U.S. markets for curbside PET bottle bales dipped from the price levels enjoyed by suppliers throughout 2005. High volume / quality suppliers commanded prices in the \$.20 per pound range during the first half of the year, but then saw prices erode due to summer volumes and less than aggressive pricing by Chinese exporters, other than on the West Coast. By the end of the summer, there was even some spot pricing in the single digits as Wellman stopped buying and prepared to close their plant in Johnsonville, SC. This was short-lived as the market absorbed the bottles previously bought by Wellman more quickly than anticipated.

Chinese export buyers remained active on the West Coast, competing mostly amongst themselves and paying prices in excess of \$.20 per pound for the second straight year with the high price posted in February of \$.275 per pound, FAS. In fact, the difference in West Coast pricing, as compared to the rest of the country, lead some bale suppliers in the Midwest to ship into California brokers.

Investments continued to be made by both Chinese exporters and domestic companies in “sort and grind” facilities. This resulted in a pronounced increase in the amount of post consumer bottles purchased by reclaimers and exporters in the form of dirty flake rather than bales. A full 19.6% of US bottles collected eventually found their way to markets in the form of dirty flake in 2006.

**NON DEPOSIT PET BOTTLE BALE PRICES**

(Picked up, Truckload quantities, Seller’s dock)

	<b>LOW</b>	<b>HIGH</b>
<b>JANUARY</b>	\$.15/LB	\$.21/LB
<b>FEBRUARY</b>	.17	.22
<b>MARCH</b>	.16	.21
<b>APRIL</b>	.15	.21
<b>MAY</b>	.14	.20
<b>JUNE</b>	.12	.18
<b>JULY</b>	.10	.16
<b>AUGUST</b>	.10	.15
<b>SEPTEMBER</b>	.09	.13
<b>OCTOBER</b>	.09	.13
<b>NOVEMBER</b>	.10	.15
<b>DECEMBER</b>	.11	.18

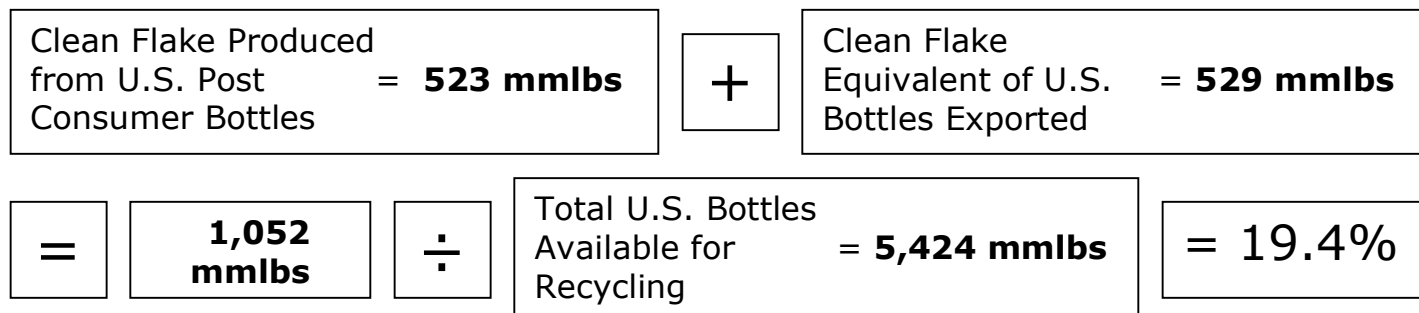
**RECLAMATION CAPACITY**

At the end of 2005, there were 14 reclamation plants producing clean flake from post consumer bottles in the United States, with a total capacity of 917 mmlbs gross weight in. By the end of 2006, there were 14 plants operating with a total capacity of 817 mmlbs. The closings of the Wellman plant in Johnsonville, SC and the SE PET Resin Recyclers plant in Polkton, NC were somewhat offset by the start-up of the Reterra plant in Houston, TX and the Global PET plant in Perris, CA. However, even with two plant expansions and several de-bottlenecking projects, the industry still saw the loss of 100 mmlbs of capacity by year's end. Of the 817 mmlbs capacity, about 65% produced material for their own consumption in the manufacture of carpet, strapping, bottles or sheet, with the remainder being available to the merchant market. With the closing of Wellman and SE PET Resin Recyclers, there are now only five reclaimers that have the ability to manufacture FDA LNO RPET.

Because of the dynamic nature of the business in 2006, an accurate reclamation plant utilization rate was difficult to calculate. However, excluding the new and closed plants the remaining core reclaimers posted a utilization rate of 86%.

<b>RPET Production Summary (mmlbs.)</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
A. RPET Produced by U.S. Reclaimers from U.S. Bottles	486	513	457	476	476	401	412	505	558	523
B. RPET Produced by U.S. Reclaimers from Imported Bottles	55	75	47	51	44	46	49	83	85	69
C. Total RPET Production U.S. Reclaimers (A+B)	<b>541</b>	<b>588</b>	<b>504</b>	<b>527</b>	<b>520</b>	<b>447</b>	<b>461</b>	<b>588</b>	<b>643</b>	<b>592</b>
D. Clean Flake Equivalent from U.S. Bottles Exported	92	75	154	143	184	212	255	298	401	529
E. Total Clean Flake from U.S. Bottles (A+D)	<b>578</b>	<b>588</b>	<b>611</b>	<b>619</b>	<b>660</b>	<b>613</b>	<b>667</b>	<b>803</b>	<b>959</b>	<b>1,052</b>

**PET UTILIZATION RATE**



The utilization rate measures the amount of clean flake produced by U.S. reclaimers and the equivalent amount of clean flake expected to be produced from exported bottles as a percentage of total U.S. bottles available. Reclaimers reported yield losses of 19% for 2006, a 1% increase after three years of improvement. This yield loss of 19% was applied to gross weight exported to obtain the clean flake equivalent of 529 mmlbs. Yields reported on imports also dropped for reasons that could not be ascertained.

Year	Clean Flake Equivalent (mmlbs.)	Bottles on U.S. Shelves (mmlbs.)	Utilization Rates
1995	622	1,950	31.9%
1996	572	2,198	26.0%
1997	578	2,551	22.7%
1998	588	3,006	19.6%
1999	611	3,250	18.8%
2000	619	3,445	18.0%
2001	660	3,768	17.5%
2002	613	4,007	15.3%
2003	667	4,292	15.5%
2004	803	4,637	17.3%
2005	959	5,075	18.9%
2006	1,052	5,424	19.4%

**2006 RPET MARKET**

The use of RPET by U.S. converters during 2006 was again, for all intents and purposes, unchanged at 855 mmlbs. This is significant, considering the reclamation plant closings and the late start-up of the new plants. Of this total, U.S. reclaimers supplied 641 mmlbs or 75% of the total demand, with 523 mmlbs coming from US bottles, 69 mmlbs coming from post consumer bottle imports, and 49 mmlbs from alternative feedstock. Canadian reclaimers supplied another 127 mmlbs and the balance came from a wide range of other sources including reclaimers in South America, Central America, Europe, India, Mexico and China.

Consumption of RPET by fiber converters was down, a reflection of the Wellman closing. The decrease in fiber applications was somewhat offset by increased RPET use in food and beverage bottles particularly by Pepsi-Cola suppliers.

Given the overall growth in the PET strapping market, it was somewhat surprising that more RPET was not consumed, but it is believed that this was an issue of availability not demand.

This year reclaimers were also asked to report on the RPET byproducts that were marketed, including thermoforms, fines and “kick-out.” The jump in the “Other” category reflects not only this reporting, but an increase in exports.

**RPET Product Categories  
RPET used (mmlbs)**

<b>Product Category</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>Fiber</b>	320	415	417	452	435	344	296	479	463	422
<b>Sheet &amp; Film</b>	71	89	68	65	37	18	32	58	71	74
<b>Strapping</b>	58	67	80	101	82	83	77	116	131	132
<b>Engineered Resin</b>	26	30	26	27	24	10	10	12	8	9
<b>Food &amp; Beverage Bottles</b>	41	52	68	54	77	86	106	126	115	139
<b>Non-Food Bottles</b>	53	47	50	40	44	43	24	63	63	49
<b>Other</b>	1	7	9	5	2	4	7	24	13	30
<b>TOTAL U.S. CONVERTER CONSUMPTION</b>	<b>570</b>	<b>707</b>	<b>718</b>	<b>744</b>	<b>701</b>	<b>588</b>	<b>552</b>	<b>878</b>	<b>864</b>	<b>855</b>



**2006 YEAR END SUMMARY**

2006 turned out to be a better year for the PET recycling industry than many forecasts had predicted at the beginning of the year. Fears of virgin PET oversupply and the accompanying price deterioration proved unfounded. PET Bottle usage continued to grow at a solid, if not spectacular, rate. Post consumer bottle collections were up and prices for bales and dirty flake provided a strong revenue stream to intermediate processors. While the increased supply ended up being exported, US reclaimers were still able to secure adequate supply at pricing that allowed them healthy margins. The fact that the merchant supply of RPET was for the most part sold out for the year didn't hurt either. Once again, US RPET end markets continued to demonstrate more demand than could be supplied, now a chronic condition. So, all in all, 2006 was a good year for all elements of the PET post-consumer bottle industry. However, there are key events and data that surfaced in 2006 that merit additional discussion as we look to 2007 and beyond.

**Wal\*Mart Affect** - During the fourth quarter of 2005, Wal\*Mart announced to their suppliers and customers that they would be evaluating the environmental impacts of all parts of their operations, including the packaging of the products they sell. While the details are still being worked out in terms of how these evaluations will be performed, there is little argument that the sheer magnitude of the implications has everyone's attention. This evaluation should put PET containers in a very favorable position to gain additional market share: they are lightweight; recyclable; have an extensive recycling infrastructure; and even food and beverage containers can be manufactured from recycled content. Putting aside the potential impacts of increased RPET demand on the PET recycling industry and Design for Recycling criteria, the attention Wal\*Mart has brought to the issues of climate change and sustainability has rippled throughout the business community. This in turn has caused suppliers and competitors to re-familiarize themselves with recycling and use of recycled content, the cornerstones of sustainability, all of which should only play out positively for the PET container and recycling industries.

**Wellman closes Johnsonville, SC plant** - Long pointed to as the model of a successful post consumer recycling business, Wellman closed its recycling division during the fourth quarter of 2006. It is the only example of a recycling company that, in the mid-nineties, converted itself to a virgin resin producer. Whatever the reasons for closing the plant, the closure sent a strong negative market signal with respect to the viability of PET bottle recycling. This occurred at a time when both public policy makers and industry leaders (see above) were beginning to re-focus on environmental issues, and PET reclaimers were enjoying their most profitable years. The Wellman reclamation plant had a 190 million pound nameplate capacity with the output being

converted to various fiber products on-site. Both the reclamation and conversion capacity will not likely be replaced soon; most of the bottles previously bought by Wellman are being exported, further increasing the gap between the amount of bottles collected and US ability to process them.

**WMI closes Chicago PRF and puts Raleigh up for sale** – Waste Management’s Recycle America subsidiary built two Plastic Recovery Facilities (PRFs), one in Chicago and one in Raleigh, to sort and granulate bales of mixed bottles. The investment, in excess of \$20 million, was aimed at eliminating labor at multiple MRFs and replacing it with centralized automatic sorting technology; it also added value through granulation. But by the end of 2006, WMI had announced the closing of the Chicago facility and Raleigh was up for sale. Aside from technical start-up problems, two market issues surfaced that are worth noting:

- 1) It is difficult to procure mixed plastic bottle bales that don’t contain a lot of non-bottle contamination in addition to the bottles that have no established markets and will not be recovered. High yield losses and the presence of more glass than might ordinarily be present in sorted bales can significantly impact production.
- 2) For a MRF to produce a bale of mixed bottles without the issues outlined above, while still eliminating labor costs, requires a significant investment in most cases. When that investment is compared to the costs to install autosort technology at the MRF, offset to some extent by the additional revenues received from sorted bales, the proposition of going to mixed bales is questionable at best. Arguably, this reality applies to MRFs large enough to utilize autosort technology effectively; the autosort units from the closed WMI plant have reportedly been installed at WMI MRFs.

This event above is mentioned to highlight a growing debate within the post-consumer industry in general that will have great implications for PET. As more and more pressure is applied by environmental groups, public policy makers, and consumers to recycle all plastic packaging, the question that emerges is “How?” Contamination levels in sorted bales often reflect the level of “mistakes” made by the public who put a variety of containers into their bins. After three years of lower yield losses, 2006 saw an increase of a little more than 1%. This normally could be viewed as a statistical aberration, yet all reclaimers interviewed voiced bale quality as their number one concern. “Other plastic packaging” was mentioned as the growing contaminant. Whether this is the result of the proliferation of single stream recycling with its higher “mistake” ratio, or Chinese buyers being less discriminate, producing good quality bales will only get more difficult as other plastics are added to the collection stream. It will take a full understanding of the issues on the part of all stakeholders, combined

with technical advances, to ensure that the investments made to date in PET bottle recycling continue to provide value to the entire recycling infrastructure.

Finally, as is mentioned a number of times in this report, there is a growing difference between the amount of PET bottles collected for recycling in the US and the capacity of reclamation plants to process them into material suitable for remanufacture. **2006 marked the first year in which more of the PET bottles collected for recycling went to export markets than stayed in the US.** Ultimately, depending on and allowing foreign markets to harvest the value of a recyclable such as PET bottles does not make good sense. Particularly as the issue of sustainability continues to gain attention and focus, the notion of moving bottles all over the world based on currency values will be increasingly hard to justify. Yet, if the processing capacity does not exist, where are the bottles to go? The question of why the US reclamation industry has been eroding during the last few years is perplexing, particularly when these years have been among the most profitable. Hopefully, the reawakening of environmental concerns will be the catalyst necessary to stimulate some world-class investment in the US.