

City of Toronto

Assessments of Improvements to Dufferin and Commissioner Street MRF's

(WDO Project Code OPT-R2-09)

Prepared with funding from the Ontario Waste Diversion Organization

March 2001

EXECUTIVE SUMMARY

Effective March 1, 2001 the City of Toronto added four new materials to its blue box program. The new materials include empty paint and aerosol cans and polycoat containers, which are comprised of gable top cartons and aseptic packages.

Quantity estimates for the new materials added to Toronto's blue box program were determined through researching municipalities that currently collect these materials. The quantity estimates for the new blue box materials amount to 700 tonnes of polycoat containers (includes both aseptic and gable top cartons), 109 tonnes of empty paint cans and 65 tonnes of aerosol cans.

Detailed analyses of bales of recyclable container materials and on the MRF residue stream were conducted. The information obtained on the types of contaminants that commonly occur in our blue box will be shared with our MRF operators to more readily identify these products.

INTRODUCTION

Effective March 1, 2001 the City of Toronto added four new materials to its blue box program. The new materials include empty paint and aerosol cans and polycoat containers, which are comprised of gable top cartons and aseptic packages. To properly plan for the blue box expansion, detailed research needed to be conducted. This research included estimating the quantity of each new blue box material, determining the market specifications, and the material recovery facility processing requirements for each new material.

The City of Toronto operates two MRFs that process blue box container materials collected from Toronto residents. Detailed analyses needed to be conducted at both MRFs prior to the expansion of the blue box program to ensure that the MRFs are operating efficiently and to identify any container processing issues.

METHODOLOGY

Quantity estimates for the new materials added to Toronto's blue box program were determined through researching municipalities that currently collect these materials. To determine a per capita quantity estimate for each new material, information was gathered on the annual tonnes collected by each municipality and on the number of residents participating in each municipal blue box program surveyed. The average per capita quantity was used to determine an estimated annually quantity that Toronto would collect for each new material added to the blue box program.

Analysis of the container residue stream was conducted randomly at both MRFs. To ensure that the residue samples were representative of the typical residue stream, the MRF operators were not forewarned that the residue analysis was occurring. The residue analysis sorted the materials into the various blue box container categories; all of the materials were weighed to determine the percentage of each blue box material in the residue stream.

Bales of PET, HDPE and Polycoat were randomly selected and analyzed. Contaminants in each bale were sorted according to their material type and weighed to determine the overall level of contamination in each bale. The analysis of the polycoat bale also determined the percentage of gable top containers versus the percentage of aseptic containers in the polycoat stream. Steel and aluminum bales were not part of this study, due to the fact that these materials are mechanically sorted, and consequently are not faced with manual sorting inefficiencies that plastic sorting is subjected to.

The composition of the current materials in the City of Toronto blue box program was analyzed. This analysis involved comparing the container material collected in the blue box program over the previous three years.

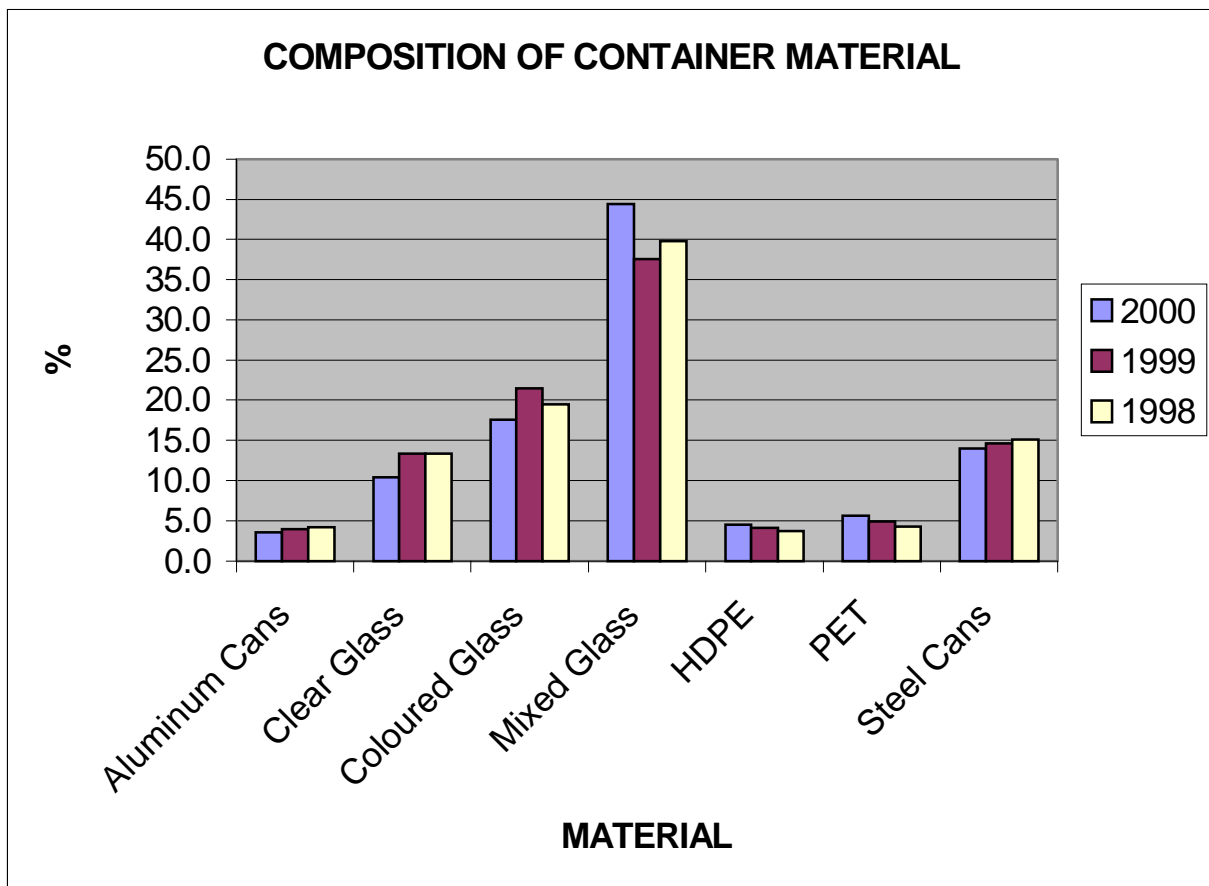
Since the new materials were added to the City of Toronto blue box program on March 1, 2001 actual quantities collected for each new material are not available at this time. However, tonnage information will be forwarded to the WDO as soon as it is available.

RESULTS

Existing Materials

The quantity of HDPE and PET collected through Toronto's blue box has slightly increased from 1997 to 2000. Blue box quantities prior to 1997 are not available for comparison purposes, due to the fact that the City of North York marketed container material separately from the former Metropolitan Toronto. The information gathered on the composition of container materials will be used for future planning purposes and MRF enhancements. Please refer to the following table and chart in this section for more detailed information on the composition of the City of Toronto recyclable container stream.

BLUE BOX CONTAINER MATERIAL						
Material	2000		1999		1998	
	Tonnes	%	Tonnes	%	Tonnes	%
Aluminum Cans	1,158	3.5	1,314	4.0	1,403	4.2
Clear Glass	3,403	10.4	4,446	13.4	4,433	13.4
Coloured Glass	5,769	17.6	7,137	21.5	6,478	19.5
Mixed Glass	14,574	44.4	12,483	37.6	13,182	39.7
HDPE	1,481	4.5	1,365	4.1	1,230	3.7
PET	1,853	5.6	1,621	4.9	1,431	4.3
Steel Cans	4,596	14.0	4,858	14.6	5,013	15.1
TOTALS	32,834		33,223		33,170	



New Material Quantity Estimates

Polycoat Containers

Per capita estimates of municipally collected polycoat containers were determined through examining municipalities that currently collect polycoat cartons. Municipalities involved in this survey include the City of Guelph, the City of Peterborough, the City of Kingston, the City of Ottawa, the Region of Peel, and Northumberland County. The per capita quantity of polycoat containers was calculated by dividing

the total tonnes marketed by each municipality by the number of residents. The average per capita quantity for each material collected from the municipalities surveyed was used to determine a per capita quantity estimate for the City of Toronto. Of the municipalities surveyed, it is estimated that on average 0.29 kg of polycoat containers are collected per capita. Based on this estimate the City of Toronto expects to collect approximately 700 tonnes of polycoat containers annually through its blue box program. Please review the following table for more information on polycoat container recycling

**BLUE BOX MATERIAL RESEARCH
POLYCOAT CONTAINERS**

MATERIAL DEFINITION:

Polycoat containers consist of both post consumer gable top and aseptic containers.

MARKETS:

Presently there are a few paper mills in the U.S. and Can. that accept polycoat containers; the paper fibre is converted into tissue paper, paper plates, etc.

MARKET REQUIREMENTS / SPECIFICATIONS:

Polycoat containers must be rinsed by residents and kept dry after processing. Mould growth is a common problem with polycoat containers, the associated odour from the mould cannot be removed in the recycling process and consequently the mills will reject loads with mould. To avoid moisture contamination problems, polycoat containers must be stored inside after processing. Gable top containers can be marketed containing between 5%-10% aseptic containers depending on the mill.

QUANTITY ESTIMATE:

The estimated per capita quantity of polycoat containers collected annually in Ontario municipal recycling programs = **0.29 kilograms** Divided by the estimated number of participating residents = 2.4 million.

The estimated tonnes of polycoat containers that Toronto will collect annually = 700 tonnes.

MUNICIPAL PERSPECTIVE:

Presently the Region of Peel, the Region of Ottawa-Carleton, Northumberland County, the City of Kingston, the City of Guelph, North York (community), etc are collecting polycoat containers in their blue box / dry recycling programs. Due to the problems of moisture and mould growth with polycoat containers inside storage is mandatory for this material.

Aerosol and Paint Cans

A per capita estimate for aerosol and paint cans could not be determined through the municipal surveys due to the fact that this material is marketed with steel food cans. A 1994 Quinte Region blue box study on aerosol and paint can recycling estimated that aerosol cans equal 1.33 percent and paint cans equal 2.2 percent of the total steel cans collected. Based on this estimate and on the amount of steel cans marketed by the City of Toronto in 1999, it is estimated that the City of Toronto blue box program will collect

approximately 109 tonnes of paint cans and 65 tonnes of aerosol cans annually. Please refer to the following table for more detailed information on aerosol and paint can recycling.

**BLUE BOX MATERIAL RESEARCH
AEROSOL & PAINT CANS**

MATERIAL DEFINITION:

Empty aerosol and paint cans that are made of steel.

MARKETS:

Dofasco and Stelco accept aerosol and paint cans with steel food and beverage cans, however some smelters do not accept them.

MARKET REQUIREMENTS / SPECIFICATIONS:

Aerosol cans must be empty and punctured. Aluminium aerosol cans do exist in the residential stream but they cannot be marketed with AL cans.

Paint cans must have the lids removed, be empty (no more than 1 cm of dried paint residue in the bottom of the can) and contain no paint in liquid form whatsoever.

QUANTITY ESTIMATE:

A per capita estimate of aerosol and paint cans collected annually could not be determined from municipal sources due to the fact that this material is marketed with the steel food and beverage cans.

A 1994 Quinte Region blue box study on aerosol and paint can recycling estimated that aerosol cans = 1.33% and paint cans = 2.2% of the total steel cans collected.

Based on this estimate, multiplied by the 4858 tonnes of steel cans marketed in 1999, the estimated tonnes of aerosol and paint cans collected annually in Toronto's blue box program = **174 tonnes (Approximately 109 tonnes of paint cans and 65 tonnes of aerosol cans)**

MUNICIPAL PERSPECTIVE:

The Region of Ottawa-Carleton, Northumberland County, the City of Kingston, the City of Guelph etc collect aerosol and paint cans in their blue box programs. Municipalities to date have had no health or safety problems with collecting / processing aerosol and paint cans.

Contamination Levels in Bales of Recyclables

The assessment of a bale of polycoat determined that aseptic containers represent 3.22 percent of the total polycoat bale. It should be noted that the City of Toronto does not collect polycoat containers from schools. Municipalities that do collect aseptic containers from schools would have a significantly higher percentage of aseptic containers in their polycoat mix.

The bale of polycoat sorted was the first bale produced from the blue box program. It is anticipated that the contamination levels in this bale will be higher than future polycoat bales, due to the fact that time is required for the MRF sorters to familiarize themselves with sorting a new material. Furthermore, only one bale of polycoat was analyzed therefore, this analysis should not be considered representative of our marketed polycoat stream. More detailed analysis of the polycoat steam is required to determine an accurate estimate of the percentage of aseptic containers versus gable top containers and to accurately determine the contamination levels in our polycoat bales.

POLYCOAT BALE			
MATERIAL	AUDITED MARCH 2001 BALES		
	Contamination kg	Aseptic %	Contamination %
AL cans	2.70		1.15
AL foil	2.85		1.21
Misc. plastic*	4.15		1.77
PET			
HDPE			
Aseptic	7.55	3.22	
Glass			
Paper	3.05		1.30
Steel cans			
Totals	234.65		5.43

It has been extremely beneficial to the City of Toronto to examine PET and HDPE bales to determine the percentage of contamination within the bales. The information gathered on the types of contaminants found in the bales has been used to educate the sorting staff to more readily identify these contaminants and in turn improve the overall quality of the plastic bales.

Due to the abundant types of plastic in the consumer market place, plastics are the most problematic in the sorting process. Information obtained on the miscellaneous plastics identified in the bale analysis will be used to better educate Toronto residents on the types of plastics that are not accepted in our program. Please refer to the following tables in this section for more detailed results of the bale audits.

MATERIAL	NOVEMBER 2000 BALES			
	PET BALE		HDPE BALE	
	kg	Contamination %	kg	Contamination %
AL cans	0.55	0.18	0.30	0.12
AL foil				
Misc. plastic*	10.20	3.36	3.55	1.38
PET				
HDPE	0.95	0.31		
Glass	2.55	0.84	3.60	1.40
Paper			0.40	0.16
Steel cans				
Totals	303.73	4.69	257.06	3.05

*Note miscellaneous plastic includes all plastics other than PET and HDPE bottles and jugs.

MATERIAL	MARCH 2001 BALES			
	PET BALE		HDPE BALE	
	kg	Contamination %	kg	Contamination %
AL cans	1.05	0.52	0.1	0.04
AL foil				
Misc. plastic*	5.25	2.60	2.3	0.98
PET			0.85	0.36
HDPE	0.15	0.07		
Glass				
Paper	0.25	0.12	0.1	0.04
Steel cans			0.1	0.04
Totals	202.15	3.31	234.7	1.47

Aerosol and paint cans

Based on visual monitoring conducted during the first two weeks of March 2001, both aerosol and paint cans have been observed in the container collection stream. Therefore, residents are aware that these materials are now accepted in Toronto's program. However, given the fact that these materials have only been added to our blue box program for a couple of weeks, the actual quantities of paint and aerosol cans cannot be determined at this time.

Residue Analysis

Detailed analyses of the residue stream were conducted at both of the City of Toronto MRFs. The information gathered has not been reported due to contractual requirements. However, the information

gathered from the residue assessments has been extremely beneficial to the City of Toronto to ensure that the contractors are operating efficiently and to identify any operational issues in sorting the blue box materials at our MRFs.

The residue analysis identified the main types of contaminants in our blue box program. Miscellaneous types of plastics such as plastic bags and tubs are the most prevalent types of contamination in our container residue stream. Information gathered on the types of contaminants in the blue box program may be used in future promotional campaigns specifically targeting products that are not acceptable.

One of the concerns with adding paint and aerosol cans to the blue box program was that residents would place full cans of paint and aerosol in the blue box. The residue analysis conducted on March 22, 2001 assessed the amount of hazardous waste occurring in the residue. This residue analysis only detected one full aerosol can in the residue. Therefore, it appears that Toronto residents understand that only empty aerosol and paint cans are accepted in the blue box program and household hazardous in the residue stream is not an issue at this time.

TRANSFERABILITY TO OTHER REGIONS/ MUNICIPALITIES IN ONTARIO

Municipalities should consider conducting an analysis of their MRF residue stream. The information obtained from a residue sort is invaluable in determining the sorting efficiency of a MRF and to identify any problems with the MRF design or the MRF operator. Furthermore, by identifying the types of contaminants that commonly occur in the residue stream, promotional and educational material can be developed to target these materials.

Municipalities planning on designing new MRF's should consider conducting a detailed analysis on the growth of plastic bottles and jugs in their municipality and factor any growth trends into the design capacity the new MRF.

Municipalities should conduct analysis on bales of recyclable materials to identify contaminants. MRF operators should be educated on the types of contaminants common occurring in bales of recyclables, to subsequently improve the overall quality of recyclable material and to ensure that market specifications are met.

This research determined that the current average capture rate of polycoat containers in Ontario municipal recycling programs surveyed was 0.29kg per capita.

The WDO report deadline of March 31, 2001 unfortunately did not provide sufficient time to determine the quantities of new materials and determine MRF processing issues. However, the actual quantities of the new materials collected will be forwarded to the WDO as soon as they can be determined.