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June 1, 2015

Will Mueller
Oversight Analyst
Waste Diversion Ontario
4711 Yonge Street, Suite 1102
Toronto, Ontario M2N 6K8

Re: CIF Committee Report on Glass Recycling

Dear Mr. Mueller,

Enclosed please find, for your reference, a copy of a report prepared by CIF staff on current issues associated with glass recycling in Ontario. At the February 17th, 2015 meeting of CIF Committee, staff was directed to forward the report, as amended, to Waste Diversion Ontario (WDO) with a request that it be passed on to the Policy Branch of the Ministry of the Environment and Climate Change (MOECC).

The purpose of this request by CIF Committee is to ensure the MOECC is fully briefed on the current challenges municipalities and industry stakeholders face in trying to divert this key Blue Box material from the residential waste stream. It is hoped that the MOECC will give it appropriate consideration as they develop new legislation and consider action the Province can take to assist Blue Box program operators to manage this material more effectively.

Thank you for your assistance in this matter.

Sincerely,

Michael J. Birett
Managing Director, CIF

Submitted on behalf of CIF Committee

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REPORT OF CIF COMMITTEE
Glass Processing in Ontario

February 17, 2015 (Amended)

1.0 Background

In November 2014, the Continuous Improvement Fund (CIF) Committee considered a report presented by staff dealing with the current status of the residential glass recycling market in Ontario. At Committee's direction, this report was updated to include current information and forwarded to Waste Diversion Ontario (WDO) with a request that it be shared with the Ministry to ensure all parties are aware of the serious nature of this market's ongoing instability.

2.0 History of Blue Box Glass Recycling in Ontario

Glass has been a part of Ontario's Blue Box recycling program since its advent in the 1980's. Despite its environmentally benign nature, its ease of recyclability and the avoided energy costs of using recycled container glass in the production of new products made it an attractive material to include in recycling programs. Unfortunately, the inherent low value of the virgin raw materials used in glass production (i.e., silica sand, soda ash and limestone), also limited the market value of recycled glass.

Glass, moreover, has proven to be a problematic material to manage in diversion programs. In the early days of the program, glass was color sorted manually at the curb. As municipalities came under increasing pressure to reduce program costs, program operators quickly realized the expense involved in its separate handling could not be justified and it was combined with the container stream. This action had unanticipated consequential impacts in the form of serious wear and tear to the capital equipment in Material Recycling Facilities (MRF) and cross contamination of the other material, notably, the newsprint stream. Glass quickly came to be viewed as a nuisance material and, as a consequence, in modern MRFs is intentionally smashed and removed at the front end of the process to minimize its negative impacts. The resulting product, which has no value on the open market, is commonly referred to as Mixed Broken Glass (MBG).

Ontario Reg. 101/94 requires that container glass be captured in Ontario's municipal Blue Box programs. Yet the lack of value combined with high handling costs and a long, declining domestic market for recycled glass, has resulted in a situation where recycled Blue

Box glass may ultimately be discarded to Provincial landfills. This situation has serious implications to overall Provincial diversion levels and public confidence in the Province's recycling programs.

Processing of residential Blue Box glass has a storied history in Ontario. The decline in the domestic market can be traced as far back as the closure of Consumers Glass' Hamilton operations in 1997. Since then, there have been numerous market failures which have impacted Ontario's Blue Box program with the most notable being the closure of Unical's Brampton operations shortly after start up.

In 2006, due to ongoing concerns about the long-term market sustainability for MBG, Stewardship Ontario (SO) made a substantial financial contribution ($1.95 M) towards Unical Inc. establishing a new glass beneficiation facility in Ontario. SO secured the participation of six Ontario municipalities (Toronto, York, Peel, Durham, Hamilton and Guelph), who committed their tonnage to ensure the viability of this project. At the outset, the municipalities committed to not less than 50,000 tonnes per year of MBG. The facility opened in mid-2007.

In late 2006, the Liquor Control Board of Ontario (LCBO) announced plans to unveil the Ontario Deposit Return Program (ODRP) in February 2007. The goal of this program was to divert alcohol beverage containers from landfill through a return to retail system using The Beer Store (TBS) locations for take-back. This included all alcohol beverage containers such as PET, aseptic, plastic laminate pouches, clear and coloured glass.

Unical had already secured equipment and the MBG beneficiation facility build was underway when the ORDP program was launched. It was assumed this program would see a reduction of approximately 50% of the glass from the residential Blue Box program but that the remaining MBG, along with other glass they could secure, would be enough to keep Unical production operating.

After only 2+ years of struggling to deal with inbound material quality and other business concerns the facility proved to be no longer financially sustainable and, in 2010, ceased operations. Municipalities were forced to find other markets for their MBG and SO received no substantive value for their financial assistance.

More recently, Klareco/Unical in Quebec as well as eCullet and Hillcrest in the United States have also shuttered their operations due to similar issues. The loss of processing capacity is a North American-wide issue with other provinces and states facing similar challenges.

3.0 The Current Processing Situation

Ontario's glass recycling options are currently limited to Canadian Liquid Processors (CLP) in Hamilton and Nexcycle in Guelph. CLP handles a very small amount of residential source separated glass (<5% of available tonnage) whereas NexCycle handles over half of the Province's residential glass and is the only facility capable of processing MBG in any appreciable quantity. Unfortunately, increasing levels of contamination and glass fines in

the municipal MBG stream is presenting growing operational and regulatory issues for NexCycle. NexCycle operates without a Certificate of Approval provided the residue content of inbound glass is 10% or less. Current contamination levels of MBG received by NexCycle are reported ranging between 10% and 30% by weight of inbound loads.

The higher levels of contamination have also created odour issues for NexCycle resulting in complaints from neighbours and MOECC orders against the company. NexCycle has in turn been forced to reject loads of glass causing issues for the municipalities and their contractors who have no other practical market options.

In early 2014, both NexCycle and CLP approached SO and the CIF separately for funding to upgrade their facilities. Both SO and CIF elected not to fund either proposal but rather encouraged the two companies to reinvest in their own operations. Instead, the CIF focused its efforts on funding improvements to upstream glass quality originating from municipal operations. NexCycle subsequently proceeded with the proposed upgrades to their facility (scheduled for first quarter of 2015) to address MOECC concerns and improve the capture of processed glass. They continue to accept loads of MBG where their contamination limits can be met. Unfortunately, the City of Toronto, the largest Ontario source of MBG, and other municipalities continue to struggle to meet NexCycle's limits. CLP continues to show interest in making a multi-million dollar investment in their facility in order to allow them to process MBG in quantity. Should this investment occur, it has the potential to address the current market problem in Ontario at a flow-through cost to Ontario ratepayers.

4.0 Contributing Factors to the Current Situation

Beyond the historical decline of the glass market, there are several factors that are key to understanding the current situation in Ontario.

4.1 Over Half of Ontario's Residential Glass is Collected Through Single-Stream Programs

In 2013, Province-wide recovery of residential Blue Box glass was reported to be approximately 93,590 tonnes (of post MRF glass product). Appendix A provides a summary of the programs in the Province which generate significant quantities of glass. Currently, 61% of the total is collected through single-stream recycling programs. This collection method results in the production of MBG. Most modern two-stream MRFs also produce MBG.

In combination, NexCycle and CLP processed approximately half of the reported tonnage. The growing lack of processing options has resulted in municipalities increasingly opting for less favourable solutions such as stockpiling, use as landfill road base, landfill daily cover and drainage material and, where necessary, disposal to landfill. CIF has recently contacted 14 municipalities to discuss their current status and confirmed that over 19,000 t/y from this group alone is not being shipped to a glass processing facility. If a similar situation is extrapolated across all Ontario municipalities, it is clear that a significant issue already exists Province-wide.

4.2 Glass Recycling Creates a Net Program Loss

Glass has historically been a low value commodity. Clean, colour-sorted glass, for example, currently has no listed value; effectively $0/tonne FOB the processor's door. MBG, by comparison, is the only glass commodity listed with a negative value and municipalities normally must pay between $25 to over $50/tonne to processors to get rid of it. In general, including negative revenue of $25/tonne, the average municipality incurs costs of over $165/tonne to collect, separate and ship the material to the processor. As such, options such as landfill road base and disposal are increasingly becoming a logical business decision for municipalities in the face of ongoing pressure to reduce program costs.

4.3 Ontario Deposit Return Program Glass Remains in the System

It was the intent of the Ontario Deposit Return Program (ODRP), implemented in 2007 by the LCBO, to have alcohol beverage containers diverted from landfill via return to TBS and other outlets versus flowing through the Ontario Blue Box system. Efforts were to be made by LCBO to provide convenient access to take-back locations (including remote areas with no TBS presence) and ensure adequate promotion of these sites and the program. While stakeholders hoped for 100% participation in this take-back program, it was understood that a small portion of these containers (including glass) would continue to be put out by residents in the Blue Box recycling program. For this reason, municipalities negotiated with WDO and SO to ensure that implicated stewards continued to pay for the portion of material that continued to flow through the Blue Box program.

At the onset of the ODRP program there was a widespread promotion and education campaign. This resulted in a positive response by residents and a reduction in the ODRP container glass found in the Blue Box program. Over time though, the participation seems to have waned and volumes within the Blue Box program are increasing on an annual basis. Municipalities and their contractors routinely conduct compositional analyses of the garbage and recycling streams collected curbside and received at their facilities. Recent studies have shown that ODRP container glass regularly represents levels between 20% to 30% of the total glass received by municipal Blue Box programs and has increased year over year.

4.4 Only One Ontario Glass Processor is Able to Receive Ontario MBG

As noted above, Nexcycle is the only Ontario processor capable of handling significant quantities of MBG and is constrained by the limits of what they can receive. The growing lack of processing options has resulted in municipalities increasingly opting for less favourable solutions such as use of glass for landfill road base, interim stockpiling and, where necessary, disposal to landfill.

In the absence of NexCycle or CLP (if rebuilt to handle MBG), there would be no known processing option for Ontario's glass within adjacent provinces or states.

5.0 Options for Future Blue Box Glass Management

There has been considerable discussion amongst the various stakeholders regarding ways to manage this material sustainably now, and into the future. The following are some options to be considered. Program stakeholders and those developing this paper believe that a solution may require the implementation of some or all options in part or in their entirety. It has taken many years to get to this point of maturation of the Blue Box program in Ontario, and we may need to look at short, mid and long-term methods of managing residential container glass to affect the level of change necessary.

5.1 Option 1: Invest in Downstream Processors

NexCycle's planned upgrades will aid in addressing their on-site compliance issues and improve their recovery of glass (typically up to 30% of inbound glass is lost in processing). However, their current contamination receiving limit will prevent them from being able to deal with highly contaminated MBG. CLP currently processes recovered container glass primarily from commercial accounts (e.g., TBS and LCBO) and municipalities with source separated glass. Their proposed plant overhaul is designed to allow them to process significant quantities of MBG but it is unproven. After the failure of the Unical initiative, however, there is a hesitancy to invest additional municipal or steward funds in private facilities, particularly if the anticipated review of the Waste Diversion Act will change municipal or steward roles and responsibilities related to the Blue Box program.

Curbside recycling programs in the U.S. face many of the same glass processing issues as those in Ontario. In response, two trends have emerged. Firstly, the principal glass container producers in the U.S. (Owens-Illinois and Ardagh Group) are providing financial support to glass processors such as eCullet in the establishment of glass cleaning plants near company container plants. Secondly, a number of the larger single-stream MRFs in the U.S. have added glass cleaning systems in the past few years.

5.2 Option 2: Invest in Glass Clean-Up Upstream at MRF's

There are approximately 51 MRF's in Ontario and ownership is close to equally split between the municipal and private sectors. The installation of glass clean-up systems in these facilities has the potential to clean up MBG sufficiently to meet the needs of processors like NexCycle. To date, the CIF and its predecessor, the E&E Fund, have invested in several glass clean-up systems in various MRF's throughout the Province with varying degrees of success. Others have been installed independent of funding. The capital cost to retrofit a MRF with a glass clean-up system is typically between $500K and $750K. At that price, only facilities receiving over 2,500 tonnes/yr of glass can justify the capital investment even with the generous payback period of eight years considered for CIF funding eligibility. As noted in Appendix A, there are approximately 12 public and private facilities that could potentially justify the capital cost of installing glass clean-up systems. Niagara and Hamilton already have glass

clean-up systems. Installation of systems in the remaining 10 plants would translate into a capital cost of up to $7,500,000 to manage a valueless material.

Even if municipalities and their private contractors were to make this investment, there would remain over 20,000 tonnes per year which would not have access to glass clean-up systems and would not meet available processors' inbound quality requirements. Some operations may be able to make arrangements to ship their glass product to other MRFs with clean-up systems for processing, but this additional handling will increase the processing costs by $40 to $50 per tonne including transfer and transportation costs resulting in an annual system cost increase of up to $1 million/yr.

5.3 Option 3: Development of an Integrated Processing System

For small volumes of glass generated in the remote and rural parts of the Province, installation of glass clean-up systems will never be justifiable. Alternatively, these municipalities could haul their glass to a MRF with a clean-up system for pre-processing. This alternative would add an estimated $50/tonne to the already sizeable loss municipalities face when recycling glass making it an unappealing option.

5.4 Option 4: Steward Funding/Responsibility

Recognizing that a systemic capital investment is likely necessary if the domestic glass market is to be maintained, the question will always be "who is responsible for bearing the cost". Arguments can be made that it should be the producer of the packaging. There are many contributing factors that have led to the current state of the North American glass market. Many would agree that the shift to single-stream collection has contributed to the current contamination level but ultimately it is the market value of a material that determines the degree to which separation and clean up can be justified. Cullet buyers reported that they cannot source sufficient material in North America to meet their manufacturing needs but are simply unwilling to pay sufficiently high enough prices to incentivize upstream processors or MRFs to invest in the equipment needed to meet cullet buyer's quality specifications. Municipalities remain under tremendous pressure from stewards and municipal councils to minimize their recycling program costs and, as a consequence, will continue to seek the lowest cost option for the management of valueless or negative value materials like glass.

5.5 Option 5: Amendment of Provincial Policy/Regulation

Perhaps the most economical, yet most politically-challenging, option would be to amend the current regulations, eliminating the requirement for recycling glass. Inclusion of glass in regulated municipal Blue Box recycling programs is required under O.Reg 101/94. By comparison, glass is not required to be collected on curbside collection routes in British Columbia's PPP program despite being obligated under MMBC's PPP program. In British Columbia, collectors that opt to accept glass on their curbside or multi-family routes must do so as a segregated stream, not commingled with other PPP. Glass is also collected through depots as a non-

commingled material. This combination of collection provides widespread accessibility for glass collection in a manner that ensures glass remains contaminant-free while facilitating cost effective diversion. Further, most European jurisdictions collect glass as a separate stream, predominantly through depot or streetscape (aka Bring) channels. Generally, jurisdictions collecting glass through separate streams, whether at the curb or through Bring channels, are not facing the same challenges as those collecting it commingled with other PPP. Enabling more flexibility for the collection of glass would be a simple way of avoiding the growing issue facing Ontario's program.

Alternatively, recognizing the use of glass in alternative applications such as landfill daily cover and/or road base as diversion are also cost effective but lower value (with the currently accepted diversion hierarchy) solutions. In British Columbia (pre-MMBC), the existing Operational Plans for landfills do not prohibit accepting glass for diversion and glass is used on site to create pipe bedding, drainage material, road base etc. MMBC has confirmed with the British Columbia Ministry of the Environment for continued local use of glass in this manner for specific landfills. The benefit with local use is that there is no transportation of glass for long distances, incurring cost and CO2 emissions, only to have it end up in down-cycled uses.

5.6 Option 6: LCBO/TBS Action Plan to Increase Capture of ODRP Materials

Ask the LCBO/TBS to develop an action plan with measurable diversion targets to reduce the amount of ODRP container glass in the municipal system. It is suggested that they use a two-prong approach by increasing both access to take-back locations in both high-density urban and low-density rural areas where TBS locations are not prevalent; and bolster promotion and education efforts to increase awareness of both the program and its locations.

5.7 Option 6: Do Nothing

In the spring of 2014, SO and CIF considered funding downstream solutions and chose instead to avoid interfering with the markets. There is serious concern about the risk of relying on NexCycle as the sole processor capable of handling Provincial volumes of glass given the regulatory compliance issues surrounding their facility. It is also clear that many municipalities and their processors cannot meet NexCycle's inbound contamination limits leaving them with no option but to stockpile glass in potential contravention of their ECA's and/or landfill the material. It is unlikely that there will be new entries to the market place throughout North America given the current lack of profitability associated with processing glass. A failure of the domestic glass market would have a serious impact on resident's confidence in recycling and Provincial diversion rates. It should be noted that glass represents 7% of the current diversion rate.

6.0 Conclusions

Ontario diverted approximately 93,400 tonnes of residential glass in 2013. This amount represents 7% of the Provincial diversion rate. There is currently only one processor in the Province capable of handling the volumes of glass generated annually and that facility is having serious challenges dealing with the quality of the glass produced by Provincial recycling programs. Should that facility close, Ontario would have no way of recycling the majority of its diverted residential glass. Upstream capital investments in glass clean-up systems at municipal and public recycling facilities is occurring but can only be financially justified in larger facilities.

The CIF believes that approximately 18% to 20% of the volume of glass diverted annually may be at risk of not having a processing option unless further action is taken. There is reluctance on the part of stakeholders to invest in the downstream processors in light of the history of failures in the industry and potential for policy change related to producer responsibility in the Blue Box program in Ontario.

Municipalities and private sector operators will continue to make capital improvements in their processing operations where financially viable. The most cost effective options to address the remainder of the market and ensure long-term program stability appear to entail an amendment to the associated regulations governing the diversion of glass and management of glass through collection depots under a deposit return scheme or recognition of alternative diversion options in combination with further efforts by LCBO to divert their container glass from the residential Blue Box Program.

Submitted on behalf of CIF Committee:

Michael J. Birett
Managing Director, CIF

APPENDIX A

Reported Glass Recovery by MRF

MRF Name	Total Glass	Single Stream?
Dufferin, Toronto, City of	13,761 T	yes
East Gwillimbury, York, Reg. Municip of	11,501 T	yes
Brampton, Peel, Regional Municipality of	8,874 T	yes
Ottawa, Metro Waste Recycling	6,997 T	-
Burlington, Halton Recycling Ltd.	5,264 T	yes
Whitby, Durham, Regional Municipality of	4,599 T	-
Hamilton, Hamilton, City of	3,735 T	-
Etobicoke, Canada Fibres Ltd.	3,433 T	-
Waterloo, Waterloo, Regional Municipality of	3,029 T	-
Niagara Falls, Niagara, Regional Municipality of	2,926 T	-
Toronto - Other	2,881 T	yes
London Regional MRF, Manning Drive	2,673 T	yes
Windsor, Essex-Windsor Solid Waste Authority	2,081 T	-
Peterborough, Peterborough, City of	1,406 T	-
Guelph, Guelph, City of	1,397 T	yes
Huron Park, Bluewater Recycling Association	1,341 T	yes
Bracebridge, Muskoka Containerized Services	1,138 T	yes
Northumberland, Northumberland, County Of	1,103 T	yes
Sudbury, Greater Sudbury, City of	1,075 T	yes
Barrie, Waste Services (CA) Inc	1,014 T	-
Kingston, Kingston, City of	937 T	yes
Pickering, Miller Waste System	927 T	-
Cambridge Waste Management MRF	854 T	yes
London, Halton Recycling Ltd.	738 T	-
Brantford, HGC Management Inc.	651 T	-
Laurentian Valley, OVWRC	599 T	-
Sault Ste. Marie, Green Circle Environmental	530 T	yes
Thunder Bay, Recool Canada	521 T	-
Mid Ontario Disposal - Orillia	517 T	-

MRF Name	Total Glass	Single Stream?
Mount Forest, Waste Management	490 T	yes
Southhampton, Bruce Area Solid Waste Recycling	465 T	-
Simcoe, Norfolk, County of	458 T	-
South Buxton, Chatham/Kent Recycling	451 T	-
Trenton, Quinte Waste Solutions	414 T	-
Napanee, Manco	393 T	yes
North Bay, Miller Waste Systems	341 T	yes
Cornwall, Cornwall, City of	281 T	yes
Alexandria, RARE	238 T	yes
Renfrew, Beauman Waste Management	220 T	yes
Brockville, Waste Mgmt Corp of Canada	177 T	yes
Tiny Township, Simcoe, County of	167 T	-
Blind River, Municip Waste and Recycling Consuls	130 T	-
Sturgeon Falls, West Nippising, Municip Env Serv	112 T	-
Petrolia, Waste Mgt Corp of Canada	66 T	yes
Carleton Place, Waste Mgmt Corp of Canada	56 T	yes
Owen Sound, Miller Waste Systems	50 T	-
Belleville, HGC Management Inc.	46 T	-
Drummondville, PQ, Drummondville	45 T	-
Winnipeg, Manitoba, Metro Waste Recycling	40 T	yes
Fast Eddie - Sparkle City	37 T	-
Burks Falls MRF (Armour, Ryerson & Burks Falls)	30 T	-
Sioux Lookout, Sioux Lookout	25 T	yes
St. Thomas, Green Lane Environmental Group	6 T	-
Devlin, Greg's Recycling	1 T	yes
Fort Frances, Asselin Transport	0 T	-
Unreported MRF	942 T	