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RE: IMPACT OF EPR FOR PPP ON CONTAMINATION

Resource Recycling Systems (RRS) was asked to research several questions generated by the Recycling Steering Committee (RSC) during the framework and scenario review and evaluation process. This is the fifth in a series of memos responding to the RSC's questions. In this memo, RRS presents the results of research to determine if Extended Producer Responsibility for packaging and printed paper (EPR for PPP) impacts contamination rates in residential recycling programs. To address this question, the RRS team studied recycling program contamination rates in Canadian provinces with EPR for PPP, and in neighboring provinces and U.S. states that do not have EPR policy in place. The data available did not lead to any conclusive assessment as to whether EPR for PPP impacts the rate of contamination in recycling program.

Methodology

The RRS team sought published information on recycling program contamination rates, such as studies and references or interviews in news articles. Where necessary, the team followed up with targeted outreach to municipalities and jurisdictions that reported data on rates of contamination in an effort to understand the details of the studies and the methodologies employed to collect the data. The research identified studies that document recycling program contamination (i.e., non-recyclable items placed in recycling bins, or sorted out as residue in recycling facilities). The research team did not identify any studies or data that addressed contamination in bales of recycled materials sent by MRFs to market.

The team focused on the same jurisdictions that were evaluated in RRS's second memo determining the impact of EPR for PPP on market stability, including British Columbia, Manitoba, Ontario, Quebec, Alberta, Nova Scotia, Maine, Michigan, Oregon, Vermont, Washington, and Wisconsin. The research team sought information on statewide or provincial contamination rates, as well as at least two communities per target state or province. Unfortunately, there were not studies or data available for all of the communities, states, and provinces targeted. A few data points for Saskatchewan were added, as they were readily available.

Research Challenges

Comparing contamination rates in different jurisdictions is challenging due the following factors:

- There is no common timeframe for when the studies were conducted, and the data varies from place to place. Contamination rates change over time for a variety of reasons, such as program changes, an evolving waste stream, the timing of education campaigns, etc. Therefore, the data is not consistently reported year over year. The most recently available data may not reflect current conditions and may not be appropriately compared to other jurisdictions in previous or subsequent years.
- Some contamination rate studies are based on outbound residue reports of material after it has been processed, while some are based on inbound waste audits prior to sorting. Given the differences in what is

counted in these methodologies, they are not appropriate to compare against one another. More detail on this challenge is provided below.

- In many instances, the specific sampling methodology is unknown, and the analytical rigor, or statistical significance of the dataset, may not be equivalent to other studies.
- There are many program elements that impact contamination rates, such as the extent of multi-family collection, whether the program uses carts or bins, or whether it is single stream or multi-stream; most studies do not control for those factors, and some don't even report those details.

There are two primary methodologies used in the contamination rate studies identified during this research:

1. **Inbound Recycling Characterization Audit:** Random samples of inbound material are isolated prior to sorting. Sample material is weighed and categorized by material type, with residue as a category for any material that is not accepted in the program. The contamination rate calculation is the weight of residue (numerator) divided by the weight of total sample (denominator).
2. **MRF Residue Calculation:** This is a calculation of material after it has been sorted based on downstream sales and disposal of material. The contamination rate is calculated by dividing the weight of material sent by the processing facility to disposal (numerator) in a given period by the total amount of material processed (material sent into recycling + material sent to disposal) in the same time period (denominator). This calculation may not be comparable to inbound characterization as it does not capture any contaminants or outthrows that are in the marketed bales as contamination. It also may include recyclables in the numerator if they are not properly sorted and flow into the residue stream. Furthermore, it may exclude from residue materials that are marketable, but not specifically accepted in the program (e.g., scrap metal).

It is worth noting that some sources rely on surveys of MRFs or market participants and do not report the methodology used to determine contamination rates.

Documented Contamination Rates

Table 1 presents the statewide and province-wide contamination rates RRS identified, along with an estimated rate for the U.S. The data presented are either based on a residual calculation of steward material (in EPR provinces) or through surveys of select communities in each jurisdiction. Reference to each source is provided in the footnotes.

Table 1. Contamination Rates for Provinces, States, and Overall U.S.

EPR for PPP	Jurisdiction	Year	Contamination Rate	Methodology
BC	Provincewide	2018	8.23%	MRF Residue Calculation ¹
Ontario	Provincewide	2018	9.8% for multi-stream 20.3% for single stream	MRF Residue Calculation ²
Quebec	Provincewide	2018	18%	MRF Residue Calculation ³
Non-EPR	Jurisdiction	Year	Contamination Rate	Methodology
Alberta	Province Wide	N/A	10% in multi stream 20% or higher for single stream	Survey of 13 commercial waste management organizations ⁴
Oregon	Multiple Communities	2019	Average 11% (range from 9 to 15%)	TRP inbound contamination survey of select municipalities ⁵
Washington	Multiple Communities	2019	Average 9% (range from 5 to 20%)	TRP inbound contamination survey of select municipalities ⁶
U.S.	Nationwide	2019	17.67% cart, 12.67% bin/bag, 16.9% average	TRP inbound contamination survey of select municipalities ⁷

Table 2 includes contamination rates from specific municipalities in the states and provinces studied.

Table 2. Contamination Rates for Cities and Counties

EPR Jurisdiction	State / Province	Year	Rate	Methodology
Surrey	BC	2017	10.90%	Inbound Recycling Composition Audit ⁸
Vancouver	BC	2017	4.60%	Inbound Recycling Composition Audit ⁹
Niagara Region	ON	2016	4.80%	MRF Residue Calculation ¹⁰
Ottawa	ON	2019	7.5%	MRF Residue Calculation ¹¹
Sudbury	ON	2017	3.27%	Inbound Recycling Composition Audit ¹²
Brandon	MB	2017-2019 3-year rolling avg.	18%	Inbound Recycling Composition Audit ¹³
Winnipeg	MB	2019	15%	Inbound Recycling Composition Audit ¹⁴
<20,000 pop in Manitoba	MB	2017-2019 3-year rolling avg.	13%	Inbound Recycling Composition Audit of 10 communities ¹⁵
Regina	SK	2019	10%	Recycling Cart Audit ¹⁶
Saskatoon	SK	2018	13%	Inbound Recycling Composition Audit ¹⁷
Non- EPR Jurisdiction	State / Province	Year	Rate	Methodology
Calgary	AB	n.d.	12-15%	MRF Residue Calculation ¹⁸
Edmonton	AB	2020	20%	Inbound Recycling Composition Audit ¹⁹
Halifax	NS	2017	19%	Unknown ²⁰
Jackson County ²¹	OR	2020	9%	Inbound Recycling Composition Audit ²²
Portland Metro	OR	2014/15 (SF) - 2016/17 (MF)	9% SF; 21% MF	Inbound Recycling Composition Audit ²³
Seattle	WA	2015	10%	Inbound Recycling Composition Audit ²⁴
Spokane	WA	2020	13%	Unknown ²⁵
Ann Arbor	MI	2019	9.91%	Inbound Recycling Composition Audit ²⁶
Lansing / East Lansing	MI	2020	16%	Inbound Recycling Composition Audit ²⁷
Chittenden Solid Waste District	VT	2016	5.70%	MRF Residue Calculation ²⁸
Portland	ME	2015	6.63%	Inbound Recycling Composition Audit ²⁹

Conclusion: There is no clear impact of EPR for PPP on contamination

The RRS team was unable to draw any conclusions on the impact of EPR for PPP on contamination based on the available data, as both sets of jurisdictions (EPR and non-EPR) had examples of both high contamination rates and low contamination rates.

RRS' research indicates that several programmatic factors are more likely to impact contamination than whether the system is governed by EPR for PPP policy. Those factors include:

- Single family vs multi-family housing: In studies that document both single family and multi-family generated materials, single family has a lower contamination rate.
- Single stream vs multi-stream collection: The studies that document contamination rates in both types of collection find that multi-stream programs have lower contamination rates.
- Bin vs cart-based collection: The studies that document the collection receptacle used found that bin-based collection systems have a lower contamination rate than cart-based systems.
- Targeted education campaigns: Robust educational programming has been documented to reduce contamination in a series of studies and efforts by Rogue Disposal, The Recycling Partnership, Cascadia Consulting Group (for the RSC), and others.

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- ¹ <https://recyclebc.ca/wp-content/uploads/2019/06/Recycle-BC-2018-Annual-Report-1.pdf>. Residue includes material managed by disposal only. There were 6,185 tonnes of material managed by recovery as engineered fuel (3.07%), which is not considered as residue, as the material is accepted in the program.
- ² <https://rpra.ca/wp-content/uploads/2018-BB-Program-Marketed-Tonnes.xlsx>, supported by email exchange with RPRRA. Rate calculated based data reported by municipalities in the Data Call process.
- ³ <https://www.recyc-quebec.gouv.qc.ca/sites/default/files/documents/bilan-gmr-2018-section-collecte-selective-english.pdf>
- ⁴ *Extended Producer Responsibility for Residential Packaging and Paper Products: Alberta Collaborative Extended Producer Responsibility Study*, Eunomia, March 2020
- ⁵ https://recyclingpartnership.org/wp-content/uploads/2020/04/The-Recycling-Partnership_WCCI-Report_April-2020_Final.pdf
- ⁶ *ibid*
- ⁷ https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2020/02/2020-State-of-Curbside-Recycling.pdf
- ⁸ *ibid*
- ⁹ <https://recyclebc.ca/what-is-contamination/>
- ¹⁰ <https://www.niagararegion.ca/government/committees/wmac/pdf/2018/WMPSC-C-14-2018-Appendix-A.pdf>
- ¹¹ Email exchange with Cam Neale, City of Ottawa Solid Waste Services
- ¹² <https://www.greatersudbury.ca/live/garbage-and-recycling/reports-and-publications/waste-diversion-plan-june-2018/>
- ¹³ *ibid*
- ¹⁴ Email exchange with Mark Kinsley, Supervisor of Waste Diversion for the City; an email exchange with Martin Racicot, Director of Field Services, MMSM, documented a 3-year rolling average of 19% for the period of 2017 to 2019
- ¹⁵ *ibid*
- ¹⁶ <https://www.regina.ca/export/sites/Regina.ca/home-property/recycling-garbage/.galleries/pdfs/waste-plan-regina-update.pdf>
- ¹⁷ https://www.saskatoon.ca/sites/default/files/documents/2018_integrated_waste_management_report.pdf
- ¹⁸ <https://www.calgary.ca/UEP/WRS/Pages/Recycling-information/Residential-services/Blue-cart-recycling/How-Recycling-Works.aspx>
- ¹⁹ Email exchange with Michael Robertson, MRF contract manager, City of Edmonton
- ²⁰ <https://globalnews.ca/news/3952709/almost-19-of-materials-sent-to-halifax-recycling-plant-get-thrown-out/>. Follow up attempt was made to the City and will be updated if more information is obtained.
- ²¹ Areas covered by Rogue Disposal, one of three service providers covering 40,000 customers in cities of Medford, Central Point, Jacksonville, Phoenix, and mid-county.
- ²² Email exchange with Laura Leebrick, Community and Governmental Affairs Manager, Rogue Disposal
- ²³ https://www.oregonmetro.gov/sites/default/files/2017/08/01/AppendixC_MultifamilyWasteCharacterizationStudy.pdf;
<https://www.oregonmetro.gov/single-family-recycling-and-waste-composition-studies-2014-15>
- ²⁴ <https://www.seattle.gov/Documents/Departments/SPU/Documents/2015ResidentialRecyclingStreamCompositionStudy.pdf>
- ²⁵ <https://www.spokesman.com/stories/2020/apr/28/recycling-project-aims-to-help-spokane-focus-on-pu/>
- ²⁶ <https://www.recycleannarbor.org/services-guide/materials-recovery-facility>
- ²⁷ *City of Lansing CART / City of East Lansing Residential Recyclables Contamination Audit Report*, Iris Waste Diversion Specialists, 2019
- ²⁸ https://19january2017snapshot.epa.gov/sites/production/files/2015-12/documents/moreau_.pdf; contamination rates ranged from 2.3% to 8.9% in the years between 1995 and 2016. The research team confirmed a rate of 6.9% in 2019 via email with Jennifer Holliday, Director of Public Policy & Communications, CSWD.
- ²⁹ https://www.nrcm.org/wp-content/uploads/2015/12/PortlandMSWStudy_twagner_Nov2015.pdf