

CIF Project 257

**Mixed Rigid Plastics
Project Support
Entropex**

Final Report

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Notwithstanding this support, the views expressed are the views of the author(s), and Waste Diversion Ontario and Stewardship Ontario accept no responsibility for these views.

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Disclaimer

This report is provided as opinion for discussion only and is **not** designed to replace qualified engineering, architectural or legal advice in any way. Readers are cautioned to obtain qualified advice and certified/approved drawings and plans prior to undertaking or adopting any recommendations that may affect their programs or facilities.



Background

Background

Mixed rigid (non-bottle) plastics have been an ongoing challenge for recycling programs in Ontario.

Recycling programs have been successful at delivering fibres (newsprint and other paper products), metals and bottle type plastics to markets that will use them as an input to new products. Mixed rigid plastics however, have been much more challenging, primarily because of the diverse nature of mixed rigid plastic feedstock.

Ontario municipalities have a growing need to market mixed rigid plastics recovered from their Blue Box programs.

To further this goal, Entropex, (the mill) has expressed their intention to purchase Ontario post consumer mixed rigid plastics, designated 1-7, from Ontario MRFs, provided the material meets or exceeds specified quality requirements as determined through process testing and market analysis.

The mill has also advised that they are prepared to work co-operatively with Ontario MRFs to establish new re-processing capacity for Blue Box plastics and to develop process and equipment protocols designed to produce material that meets or exceeds established market specifications.

Project Description

With the support of the CIF and Stewardship Ontario, the mill was tasked with the development of a detailed material specification and an evaluation of five MRF test suppliers recruited to provide sample loads of material for processing at the mill. The mill subsequently engaged The Emerald Group as consultants to assist with the project.

The scope of work assigned to The Emerald Group consisted of :

1. The development and preparation of MRF processing protocols and/or operating guidelines sufficient to provide municipal and/or private MRF operators with adequate instructions for preparing suitable feed stock material for shipment to Entropex.
2. The analysis of MRF procedures and operations at five test facilities and/or training of MRF or other staff:
 - (a) sufficient to produce acceptable quality material for delivery to Entropex,



(b) sufficient to permit MRF operators to identify and apply for CIF funding to modify equipment or processes as required to meet mill specifications.

(c) provide any protocols developed to CIF for evaluation.

(d) provide interim progress reports as directed.

This report is the final project progress report to November 15, 2010

Mill Specification Development

Project Description Mill specifications developed for this project are a balance between quality control for the mill, ease of implementation for the MRFs, specific materials to be included/excluded, shipping protocols, rejection procedures and product pricing.

Of necessity, the mill specifications described above must be a blend of all the required components that results in a compromise which still remains workable for all parties.

Consultations with the mill combined with on site evaluations of sorting/capture processes at the test MRFs were used to develop the preliminary mill specs.

To achieve the necessary components of the mill spec. numerous drafts were debated internally and a preliminary mill spec. was developed for initial circulation to all stakeholders.

Stakeholders The stakeholders involved in this project are:

1. Entropex (the mill)
2. The Continuous Improvement Fund
3. Stewardship Ontario
4. The City of Guelph



5. York Region
6. The City of Hamilton
7. The City of Sudbury
8. The Ottawa Valley Waste Recovery Centre

Initial circulation of the draft mill specs. was done in May-June 2010 and feedback was incorporated into the document for another round of stakeholder consultations.

Another round of feedback was incorporated into the mill spec. by early August 2010, and a draft final spec. was produced and circulated.

Following completion of initial process testing trials it was judged that no further modifications to the published spec. are necessary at this time. It should be noted however, that additional modifications may be necessary from time to time as market and supply conditions vary. A copy of the final version of the spec. is attached below as Schedule "A".

MRF Capture Process Observations

As part of pilot testing project, the mill was required to observe the mixed rigid plastics (MRP) recovery processes at the MRFs designated for participation in the test.

This section sets out a summary of the results of the MRF tours and observations prior to the commencement of process testing at the mill.

Additional modifications and processing protocols may need to be developed following processing and analysis of the test loads supplied by the MRFs.

Summary

Following observation of operations at all the pilot MRFs, a number of common issues/observations were identified and are summarized below; these issues do not need further attention at this time based on the results of mill process testing.



- Target shipping weights of 17mt/load may be difficult to achieve in facilities with single ram balers. The mill spec for shipping has been modified to permit the application of a prorated adjustment if necessary.
- A series of test loads processed to establish average baseline quality and material composition will be required from each participating MRF before full production is started or approved supplier status is established for a specific MRF.
- MRP bales should be stored indoors to avoid excess moisture contamination.
- MRFs may benefit from waste audits to determine if significant amounts of MRP can be captured from residue.
- MRFs performing positive pick sorting of MRP are likely to achieve better quality control.
- Other sorting methods will be evaluated during baseline process testing.
- Contamination levels may be an issue in some MRFs and the mill will work with them individually as required to achieve the target quality control.

Conclusion and Recommendations

- The project is progressing according to overall plan and timelines.
- No recommendations for MRFs will be made at this time, however some MRF modifications may be recommended in future contingent on baseline testing of material received from them.
- The mill will begin production of material at controlled rates until process equipment has been fully commissioned.
- No further modifications to the published spec. are necessary at this time, however, additional modifications may be necessary from time to time as market and supply conditions vary.

Best Practices

This project fits within the following fundamental best practices as identified by the Blue Box Program Enhancement and Best Practices Assessment Project (2007).

- Optimization of operations in collections and processing



SCHEDULE “A” SPECIFICATIONS

ENTROPEX

Mixed Rigid Plastics Material Specifications And Best Practices



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Background

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Mixed rigid (non-bottle) plastics have been an ongoing challenge for recycling programs in Ontario.

Recycling programs have been successful at delivering fibres (newsprint and other paper products), metals and bottle type plastics to markets that will use them as an input to new products. Mixed rigid plastics however, have been much more challenging, primarily because of the diverse nature of mixed rigid plastic feedstock.

Ontario municipalities have a growing need to market mixed rigid plastics recovered from their Blue Box programs. Entropex, (the mill) is prepared to purchase Ontario post consumer mixed rigid plastics, designated 1-7, from Ontario MRFs, provided the material meets or exceeds the specified quality requirements set out below.

The mill is prepared to work co-operatively with Ontario MRFs to establish new re-processing capacity for Blue Box plastics and to work with MRFs on process and equipment protocols designed to produce material that meets or exceeds established market specifications.

To that end, subject to certain conditions set out below, the mill is prepared to purchase material from Ontario MRFs on an ongoing basis.

Material Specifications

Plastic Material Types Included

Processed material shall be baled for shipment. The following types and designations of materials may be included in bales.

- Any household post-consumer plastic container designated 1-7.
- This includes thermoforms, packaging, cups, trays, clamshells, food tubs/lids and all household non-bottle containers.
- This may include all 1-7 bottles.
- Loads must consist of a mixture of material types in proportions normally found in Ontario blue box collection programs.

The types of plastic that are acceptable are:

- PET - # 1
- HDPE - # 2
- PVC - # 3
- LDPE - # 4 (excluding film)
- PP - # 5
- PS # 6 (Polystyrene only – no foamed polystyrene)
- OTHER - # 7

Plastic Material Types Excluded

The following types and designations of materials may **NOT** be included in bales.

- ABS Plastic
- Polycarbonate
- Acrylics
- Fiberglass
- All types of plastic films
- Any other plastics that are not mentioned in the list of “material types included” above or normally collected in municipal curbside recycling programs.

Contamination Rates/Types

Total contamination of all types shall not exceed five percent (5%) by weight of any material sent for processing. Contamination may be composed of, but is not limited to, any of the following:

- Metals (ferrous and/or non ferrous)



- Excessive liquid residues
- Liquid or frozen precipitation (from outdoor bale storage)
- Expanded polystyrene
- Paper
- Plastic bags
- Plastic film
- Paint residue

**Contamination
Excluded**

Material sent for processing shall **NOT** contain any of the following contaminants:

- Plastic Toys
- Wood
- Glass
- Oil, grease or petroleum product containers
- Rock, stone, mud, dirt
- Biological material
- Medical material/waste
- Hazardous material/waste
- Pesticide, herbicide and any other hazardous chemical containers
- Bulky rigid plastic items such as carts, crates, baskets, lawn furniture and any pails or buckets exceeding a twenty (20) litre capacity.
- Construction materials such as pipe, hose, tubing, siding, shingles, plastic or foam insulation, etc.
- Paint containers
- Metal - hangers, pail handles, wire, spools, containers, lids, caps etc.

Other materials designated by the mill as excluded contaminants may be added to this list from time to time and notification shall be provided to suppliers of all new exclusions forthwith.

Shipping Protocols

Subject to certain distance from the mill and target weight restrictions, the mill shall pick up material from the supplier at no charge.

Prior to any material being shipped, all shipping arrangements, restrictions and conditions shall be finalized with each supplier separately.

Bale Specifications

Material made available for shipping shall be baled and shall meet the following shipping specifications:

- Minimum shipping quantity shall be one (1) full truckload.
- Loads shall have a target shipping weight of 17,000 kg. Under weight loads may be subject to prorated shipping charges.
- Bales shall be free of visible snow, ice or excess water/liquids
- Bales shall be tied securely with strands of wire with sufficient tension to secure the bale integrity through loading unloading and storage.
- Specific bales may be rejected during loading if visibly contaminated.
- Loads must be identified on each out bound bill of lading and referred to as 'Mixed Rigid Plastic Containers'.

Shipping Schedule

Shipping pick up dates shall be arranged with each MRF according to their production schedule and mill truck availability. The mill requires a minimum of two (2) business days notice of a load being ready for pick up.

MRFs requiring shipping at times other than those agreed by the mill shall be responsible for arranging and paying directly for third party shipments.

All third party shipments must be prearranged with the mill or acceptance of the load will not be assured.

Shipping Weight

All loads must be weighed and the weigh scale ticket must accompany each load. In the event that a truck arrives without a scale ticket the truck will be weighed by the mill and that weight will be used for invoicing purposes.



Material Analysis

Preamble

The mill recognizes that “Mixed Rigid Plastics” is a new category of recycled material to be produced at Ontario MRFs. Due to the uncertainties involved with new industrial processes, the mill agrees to work with MRF operators as much as possible to educate, train and advise operating staff on how to achieve an acceptable quality of material delivered to the mill for processing. The mill will further undertake to exercise rejection protocols only after reasonable efforts are made to correct contamination or other issues first.

Each new MRF seeking to ship MRP to the mill shall have a series test loads processed by the mill to establish an analysis of the inbound MRP bales for material composition and contamination levels. This test run will establish a baseline for the material produced by the MRF and provided the MRP supplied meets quality specifications, the MRF will continue to be an Entropex approved MRP supplier.

Visual Inspection

Each load of material received at the mill will be processed as a separate unit. Prior to processing, bales will be visually inspected for overall contamination and excluded contaminants. Provided the load passes the initial visual inspection it will be scheduled for processing.

Loads of material that do not pass a visual inspection prior to processing may be subject to any or all of the following rejection protocols in the sole discretion of the mill.

Material Analysis

Loads of material that pass visual inspection will be processed by the mill within thirty (30) days of delivery. A test analysis report will be generated by mill optical sorting equipment that identifies the components and contamination levels by percentage.

Each load of material may be analyzed separately during processing so material types, percentages and contamination components can be attributed to a specific supplier.

Loads of material delivered for processing must contain the average portion of acceptable material types normally found in residential blue box collection programs. Loads that contain significantly more or less of any of the acceptable materials may be subject to any or all of the following rejection protocols in the sole discretion of the mill.



**Excess
Contamination by
Weight**

Loads of material that pass visual inspection and are processed may be found to contain contaminants exceeding five percent (5%) of total weight. These loads may be subject to any or all of the following rejection protocols in the sole discretion of the mill.

Rejection Protocols

Rejection Protocols

Following the processing of a load or part load that is deemed below acceptable quality, any additional material that has already been delivered for processing may be subject to any or all of the following rejection protocols following written notice to the supplier.

With the permission/agreement of the supplier:

- Process load and deduct extra labour/residue losses from any payment due.
- Return load to MRF, (shipping charges may apply).
- Send load to landfill and deduct costs from payment due.
- Cost of residue, transportation and landfill may exceed the value of the material processed; these costs may be billed back to the supplier;

In the sole discretion of the mill.

- Restrict or decline further shipments from the MRF
- Return load or part load to supplier, (shipping charges may apply) if supplier can not agree to an alternate solution within ten (10) days following notification of issues with the material.

MRF operators are advised that the mill will undertake to exercise rejection protocols, if necessary, only after reasonable efforts are made to correct contamination or other issues first.



Payment Rates and Terms

Market Rate	<p>Subject to deductions for any material that does not meet quality specifications and/or the application of any rejection protocols or shipping adjustments, the mill shall pay to the supplier the market price per tonne of material as established by the mill as required.</p> <p>The market price will be subject to adjustment from time to time based on current market conditions. Suppliers shall be given seven (7) days advance notice of any price changes.</p>
Terms	<p>Payment shall be made in Canadian Dollars on a net thirty (30) day basis from date of receipt of material at the mill.</p>
Adjustments	<p>No payment shall be made for any excess rejected material, contaminant or non-usable material delivered with any load.</p> <p>In the event any price adjustment is required, a material analysis report will be delivered to the supplier with all payments indicating the net weight, composition and contamination percentage of the load/s processed and any adjustments deducted from payments due.</p>

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