E&E Project Evaluation Form

*****Please be advised that completed evaluations are made available publicly and are posted on Stewardship Ontario's E&E Fund web site*****

Project Name/Number/Priority area:	Peel Region MRF Optimization Study / PN 85/ MRF Rationalization
Lead Sponsor/competed by/date:	Entec Consulting Ltd. / February, 2006
Project Duration:	6 months
Total project value:	$24,600
E&E funding amount:	$19,600 ($5,000 to review plastic options and $14,600 for the bag breaker research)

Section 1 –To be completed by Project Applicant

1) What were the Project Goals and Objectives *(as per the E&E Application and/or Contract*)?

As per the project application, the Peel Region MRF Optimization Study included the following two components:

- Research commercially-available bag-breaker technologies for the automated processing of recyclables collected in plastic bags (including information related to reference MRF locations, mechanical reliability, throughput capacity, operational constraints); and
- Carry out a cost-benefit analysis to evaluate the feasibility of adding an automated optical sorter for plastics at the Region of Peel MRF. The analysis considered the following scenarios:
    - Status quo – the present design and operation of the MRF, as proposed by the private operator (Waste Management of Canada Corporation)
    - Option 1 – optical sorting of mixed plastics to be shipped to WMCC's CID Chicago plant; and
    - Option 2 – optical sorting of four individual plastic resins (all PET; coloured HDPE; natural HDPE; and mixed rigid plastic containers)

2) **Were the goals and objectives met*?*** *(and if not why not?)*

Both objectives were met.

3) **Summary of Project Accomplishments** *(i.e. what did the project do/achieve?):*

Bag Breaker Component: Six bag breaker technologies (two manufactured in North America and four in Europe) were identified. Manufacturers were contacted and asked to provide comparative technical data. MRF operators were contacted to determine operational performance and reliability for each breaker. Three of the breakers were seen in operation in their respective MRF (Colchester, NS; Guelph, ON; and Ipswich, UK). Capital and operating costs were identified in addition to film sorting performance and costs in five operating MRFs.

Optical Sorting Component: The project identified the capital and operating costs inherent in each of the two proposed options (optical sorting of mixed plastics, and optical sorting of 4 individual plastic resins [all PET; coloured HDPE; natural HDPE; mixed rigid plastic containers]) and compared these costs to the "status quo" alternative of manual sorting of plastics, as per the original tender and MRF design. As part of the analysis, a spreadsheet model was developed to assess the degree of quality control sorting required for the ejected plastic resins, and to identify if further sorting of the remaining products was justified based on the potential revenue of each material.

4) Summary of Project Limitations *(e.g. is there anything that should have been done differently?)*

Bag Breaker Component: The project relied on cooperation of the equipment manufacturers and was hindered by the lack of response to information requests by one of the European manufacturers. Also, although industry sources recounted that one of the breakers removed film plastic from the recyclables during the bag opening process, the consultant was unable to substantiate this directly with either the equipment manufacturer or the MRF operator. The cost of a site visit to France to observe the breaker in operation was beyond the scope of the available project budget.

Optical Sorting Component: The only issue of concern was the length of time taken by the Peel MRF operator to respond to requests for additional data and clarifications (hence extending the duration of the project).

5) What do you consider to have been the key "lessons learned" from this project? Does your project/activity represent a "best practice"?

Bag Breaker Component:

Lessons learned:

- Bag breaking technology has improved considerably over the past 5 years
- For Ontario MRF applications, there are only two bag breakers (Bulk Handling Systems and Machinex Industries) that are manufactured and readily available in North America. The availability of the three other bag breakers in North America is not clear.
- In general, the cost of removing film plastic (including the cost of the breaker) varies between about $6 and $10/tonne processed.

BB Best Practice:

It is considered that this project does identify "bag breaker best practices", as the report presents technical data and operating experience for each of the breakers commercially available to MRF operators as well as performance and cost information for film plastic sorting where these breakers are used.

Optical Sorting Component:

Lessons learned:

- In most cases, quality control sorting is still required in conjunction with the use of an optical sorter
- Even though optical sorting is capable of replacing manual sorters (in this case 6 staff for one of the options), the net cost was still slightly greater than manual sorting given the specific Peel contract conditions.
- The project established a possible methodology for evaluating the business case of installing plastics optical sorting equipment in a MRF

6) What specifically are municipal staff doing with the experiences and data from this project? Do you have plans to apply these lessons in your program? Please explain how.

Bag Breaker Component: Using the findings of this report, municipalities are able to assess the technical options for breaking bags and the processing cost implications of collecting recyclables in dedicated plastic bags.

Optical Sorting Component: Using the findings of this report, the Region now has a basis for entering into negotiations with WMCC and knowing at what price ($/tonne) optical sorting is justified.

A Peel Region representative has been invited to present the findings from this project at the next Ontario Recyclers Workshop, scheduled June 1st, 2006 in Ottawa.

Section 2 –To be completed by Stewardship Ontario (and reviewed by applicant)

9) Did this project do what it set out to do? If not, what were the reasons/ barriers?

This project achieved all the objectives as set out in the original project agreement.

10) What are the key learnings from this project? Are there any next steps? What is being done to share the results?

Bag Breaking Component:

As a second phase of this project, Peel has requested $155,125 from the E&E Fund (25% of the total cost) to purchase and install a bag breaker that will enable the Region to process bagged recyclables. The technology selected by Peel (BHS) received a favourable evaluation from the research carried out by the consultant. Peel is currently in the process of installing the bag breaker and launching its new single stream recycling and supplemental bag system. Peel will monitor the impact of the installation through a series of waste audits. They will report on the results in December 2006.

Optical Sorting Component:

Installing optical sorting equipment for mixed plastics would enable Peel to significantly reduce its labour costs (from 14 to 3 sorters). To be comparable to the manual sort status quo however, the Region would need to receive between $424 and $490/tonne for the plastic material, depending on whether aluminium is recovered or not before selling the mixed plastic stream.

One of the recommendations to come out of this report is for Peel to consider the feasibility of sending plastics (some or all) to a GTA central processing facility (as opposed to the MW facility in Chicago). Stewardship Ontario has approved the Region of Peel's request for an evaluation of the feasibility of a GTA Plastics Recovery Facility (PRF). This study is currently underway.

An additional E&E Fund study on the feasibility of installing optical sorting equipment for PET and HDPE at the City of Toronto's Dufferin MRF was recently completed. The study found that the payback period for an optical sorting system that displaces three HDPE and PET manual sorters will be between 4 and 5 years.

While for the purposes of the Dufferin analysis, it was assumed that an optical sorting unit would produce similar HDPE and PET recovery rates as with manual sortation, the methodology used for evaluating the business case of installing plastics optical sorting equipment at the Peel MRF assumed a 90% primary hit rate for the sorter, and a 90% purity rate for the ejected stream. In future, it may be a good idea to standardize the methodology for feasibility/cost-benefit studies around optical sorting of plastics. This would ensure that the findings produced are comparable from one study to the other.

11) Was the project good value for the money *(e.g. were there measureable program or system cost reduction benefits, cost effective tonnage increases, etc?)*

The idea of using bags to allow resident to set out additional blue box materials is of interest to many municipal program operators. The success of this initiative will in part depend on the efficiency of the bag breaker system. With regard to the optical sorting component, the scope of the study in Peel was very limited. It is expected that some of the actual optical sorting technology implementation projects (in particular the one at Toronto's Dufferin MRF) will provide more detailed and replicable results for other Ontario municipalities.

12) Does this project represent "best practices"? If yes, explain.

Labour costs represent a significant portion of MRF operations, and as such, initiatives to assess whether these can be reduced through the installation of technology such as optical sorting represents a promising avenue for reducing system costs.

We will need to await the results from Peel's bag breaker system's first year of operation to come to any conclusions regarding the use of bags/bag breakers as a cost effective way to provide supplementary blue box recovery.

13) Tonnage and Financial Summary

Total project cost – $24,600
E&E contribution – $19,600
Other Cash/in-kind contributions – Peel Region contributed $5,000 in cash