Responsible Recycling Task Force

Meeting #4 – July 18, 2018
Agenda

• **9:00 – 9:10:** Welcome & Introduction
  (Jeff Gaisford)

• **9:10 – 9:40:** Fiber Markets Overview
  (Kevin Kelly & Eric Elliott)

• **9:40 – 10:10:** Plastic Sorting, Processing & Markets
  (Sego Jackson on behalf of Merlin Plastics)

• **10:10 – 10:45:** Secondary Sorting & Processing
  (Scott Farling)

• **10:45 – 10:55:** Existing Research and Further Study
  (Lisa Sepanski)

• **10:55 – 11:00:** Wrap Up & Next Steps
  (Julie Colehour)
Task Force Goals

• **Short Term Goal:** To help identify near-, mid- and long-term actions in response to reduction in export markets for mixed recyclable materials due to China National Sword policies.

• **Longer Term Goal:** To help establish commitment across the region to responsible recycling and domestic sorting/processing of curbside recyclables.

• **Outcomes:** Prepare a report with actionable items and recommendations for future action by all; if possible, develop interim tools for communications and other topics that are more immediately available.

• **Role of Task Force:** Not to make decisions, rather to learn about the problem, understand activities that are being implemented elsewhere and opportunities for change. They will provide guidance on next steps that will be brought back to county advisory committees and decision makers.
Updates from previous meetings

• June 18 Meeting Minutes approved

• Update on removal of plastic bags and shredded paper recommendation

• Update on waivers
International Fiber Markets Overview

Kevin Kelly, General Manager, Recology
Paper Recycling in the Pacific Northwest

Eric Elliott, Recycling Coordinator and Compost Technician, Seattle University
Background

China National Sword Campaign
- Seattle University Business School research project
- US, Europe, and Asian markets affected
  - ½ of recyclable exports went to China (1/6 of all US recycling)
  - Price of mixed fiber fell dramatically - $146/ton to $5/ton in 6 months
  - Average US contamination rate is 5%, although in reality it is much higher
- Report is done under assumption China won't lift ban
Timeline

Recyclables limits

Green Fence

Importer Practices

National Sword

Blue Sky

2006 2013 2015 2017 2018
Year over Year Changes

![Graph showing Year over Year Changes in Recyclables Imported into China during the First Two Months of 2017 and 2018. The graph compares Scrap Paper and Scrap Plastic, with significant changes in the quantities imported between the two years.](image)
The Economic Model

Post-National Sword Supply and Demand for Post-Consumer Paper

Price

Price ($146)

Price’ ($5)

Demand

Demand’

Supply

Supply
The Economic Model

Future Supply and Demand for Post-Consumer Paper

Price ($146)
Price” ($?)
Price’ ($5)

Demand
Demand’
Demand”

Supply

Quantity
Catalog of Paper Mills in WA and OR
THE PAPER MILL INDUSTRY AT A GLANCE

(American paper mills as of 2018)
Catalog of Working Paper Mills

17 currently operating paper mills in WA and OR

- Mills currently accepting post-consumer fiber
- Mills NOT currently accepting post-consumer fiber
Catalog of Working Paper Mills

10 paper mills accepting post-consumer paper fiber
  ◦ 6 of which accept only corrugated cardboard (OCC)

GP Halsey, Inland Empire, NORPAC, and Sonoco: only mills accepting other paper fibers

Only NORPAC and Sonoco accepting MIX grade paper
<table>
<thead>
<tr>
<th>Type(s) of Post-Consumer Material Accepted</th>
<th>Company Name</th>
<th>City</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Grade Paper Fiber</td>
<td>Georgia-Pacific Corp - Halsey</td>
<td>Halsey</td>
<td>OR</td>
</tr>
<tr>
<td>Old newsprint</td>
<td>Inland Empire Paper Co</td>
<td>Spokane</td>
<td>WA</td>
</tr>
<tr>
<td>Mixed paper, Old magazine grade, Old newsprint, Sorted office paper</td>
<td>North Pacific Paper Corp (NORPAC)</td>
<td>Longview</td>
<td>WA</td>
</tr>
<tr>
<td>OCC, Old Newsprint, Mixed paper, All Book Grades, Telephone Directories</td>
<td>Sonoco Products Co</td>
<td>Sumner</td>
<td>WA</td>
</tr>
<tr>
<td>OCC (Old Corrugated Cardboard)</td>
<td>Georgia-Pacific Corp - Toledo</td>
<td>Toledo</td>
<td>OR</td>
</tr>
<tr>
<td>OCC</td>
<td>Caraustar Industries</td>
<td>Tacoma</td>
<td>WA</td>
</tr>
<tr>
<td>OCC</td>
<td>International Paper Co</td>
<td>Springfield</td>
<td>OR</td>
</tr>
<tr>
<td>OCC</td>
<td>Kapstone Paper &amp; Packaging Corporation</td>
<td>Longview</td>
<td>WA</td>
</tr>
<tr>
<td>OCC</td>
<td>Port Townsend Paper Corp</td>
<td>Port Townsend</td>
<td>WA</td>
</tr>
<tr>
<td>OCC</td>
<td>WestRock Co.</td>
<td>Tacoma</td>
<td>WA</td>
</tr>
<tr>
<td>NONE</td>
<td>Boise Paper</td>
<td>Wallula</td>
<td>WA</td>
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<tr>
<td>NONE</td>
<td>Clearwater Paper Corp</td>
<td>Lewiston</td>
<td>ID</td>
</tr>
<tr>
<td>NONE</td>
<td>Cosmo Specialty Fibers Inc</td>
<td>Cosmopolis</td>
<td>WA</td>
</tr>
<tr>
<td>NONE</td>
<td>Georgia-Pacific Corp - Camas</td>
<td>Camas</td>
<td>WA</td>
</tr>
<tr>
<td>NONE</td>
<td>Georgia-Pacific Corp - Wauna</td>
<td>Clatskanie</td>
<td>OR</td>
</tr>
<tr>
<td>NONE</td>
<td>Nippon Dynawave PackagingCo</td>
<td>Longview</td>
<td>WA</td>
</tr>
<tr>
<td>NONE</td>
<td>Ponderay Newsprint Co</td>
<td>Usk</td>
<td>WA</td>
</tr>
<tr>
<td>Closed</td>
<td>WestRock Co.</td>
<td>Newburg</td>
<td>OR</td>
</tr>
<tr>
<td>Closed but may reopen</td>
<td>McKinley Paper / old Nippon</td>
<td>Port Angeles</td>
<td>WA</td>
</tr>
</tbody>
</table>
Challenges to Paper Mill Expansion

- Glass contamination
  - A “death nail” to the paper recycling process
- Regulation and PCBs
  - Inland Empire reducing production
- Wax-coated and aseptic containers
- “$10-40M” in paper mill upgrades in order to process more post-consumer paper (Gee 2018)
Future Steps

Some Expansion
- Potential new mills in Port Angeles and Newberg

Success depends on system-wide collaboration
Thank You!

Eric Elliott

Seattle University Facilities

Recycling Shop

elliotte@seattleu.edu
Plastic Sorting, Processing & Markets

Sego Jackson, SPU – Presenting on behalf of Merlin Plastics
History of Merlin Plastics

1987 - Founded in Delta, British Columbia to process post-industrial plastics.


1992 - Added post-consumer rigid HDPE material (eg. pails, buckets).

1995 - Added post-consumer Film to the processing line.

1996 - Developed a post-consumer PET processing line in British Columbia.

2004 - USA Patent No. 6,752,192 was issued to Merlin Plastics for the pre-wash technology that was first developed in 1996.

2006 - Obtained FDA approval for post-consumer PET Flake for food contact.
History of Merlin Plastics

2009 - Peninsula Plastics Recycling (PPR) was incorporated as a full service PET recycler and processor in Turlock, California.

2010 - Obtained FDA approval for post-consumer PET Pellet for food contact.

2014 - Acquired an interest in ORPET, an Oregon recycler, and partnered with the Oregon Beverage Recycling Cooperative to recycle PET bottles in Oregon.

2015 - State-of-the-art container sortation facility in New Westminster, BC was commissioned to sort cartons, ferrous and non-ferrous cans, plastics and glass.

2016 - Acquired assets of Entropexin Sarnia, Ontario. Upgraded and re-designed the sorting, washing and processing systems and we are now currently processing 3 to 7 containers on the East Coast.
Costs and Revenues

Transportation
The transportation costs from the King County area to the sorting plant in BC
  – approximately US$0.01 to US$0.02/lb
  – approximately US$600/truckload

Sorting
Sorting costs money and is determined by
  – the mix of plastics in the recycling bins
  – the presence or absence of contaminants
Revenue

○ The most valuable products recovered from curbside plastics
  - PET
  - Natural and Colored HDPE

○ Recyclingmarkets.net is one of the reliable sources of information for secondary material pricing.
### Plastics (Click on Grade description for Specifications)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Historical</th>
<th>Current</th>
<th>Previous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics</td>
<td>PET (Baled, €/lb, picked up)</td>
<td>View</td>
<td>11-12</td>
<td>11.50</td>
</tr>
<tr>
<td>Plastics</td>
<td>PET Curbside Grade B in CA (Baled, €/lb, picked up)</td>
<td>View</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Plastics</td>
<td>Natural HDPE (Baled, €/lb, picked up)</td>
<td>View</td>
<td>32-36</td>
<td>34.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>Colored HDPE (Baled, €/lb, picked up)</td>
<td>View</td>
<td>10-14</td>
<td>12.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>Commingled (#1-7, Baled, €/lb, picked up)</td>
<td>View</td>
<td>2-4</td>
<td>3.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>Commingled (#3-7, Baled, €/lb, picked up)</td>
<td>View</td>
<td>3-0</td>
<td>-1.50</td>
</tr>
<tr>
<td>Plastics</td>
<td>Mixed Bulky Rigid (Baled, €/lb, picked up)</td>
<td>View</td>
<td>6-8</td>
<td>7.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>FILM - Grade A (Sorted, 800+lb Bales, €/lb, picked up)</td>
<td>View</td>
<td>1-5</td>
<td>3.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>FILM - Grade B (Sorted, 800+lb Bales, €/lb, picked up)</td>
<td>View</td>
<td>10-12</td>
<td>11.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>FILM - Grade C (Sorted, 800+lb Bales, €/lb, picked up)</td>
<td>View</td>
<td>2-4</td>
<td>3.00</td>
</tr>
<tr>
<td>Plastics</td>
<td>LLDPE-Stretch Film (Refer to FILM grades A, B, C)</td>
<td>View</td>
<td>1-2</td>
<td>1.50</td>
</tr>
<tr>
<td>Plastics</td>
<td>PP Post Consumer (Baled, €/lb, picked up)</td>
<td>View</td>
<td>7-10</td>
<td>8.50</td>
</tr>
<tr>
<td>Plastics</td>
<td>Polystyrene EPS (Baled, €/lb, picked up)</td>
<td>View</td>
<td>1-3</td>
<td>2.00</td>
</tr>
</tbody>
</table>
Curbside Plastic Containers to Pellets

Sort

Process

Transport

Merlin Group

July 2018
Container Circular Path

NATURAL RESOURCES - OIL-BASED RESIN

RECYCLE • RÉMANUFACTURE • REPURPOSE

RESIDUALS

PLASTICS SOLUTION FOR THE FUTURE
Secondary Sorting & Processing: Providing “Blue Bin Accountability”

Scott Farling, Titus MRF Services
Blue Bin Recycling is at Risk

• Problem: **Blue Bin Recycling is at Risk**
• Solution: **Secondary MRF Process is Ready**
• Use our experience and expertise to implement our solution
• Provide benefits to all stakeholders
Opportunity to Optimize

The Secondary MRF is the Missing Link

• Aggregates, sorts, and recovers truckload quantities of low volume materials
• Advanced technologies for sorting materials efficiently and economically
• Extends existing MRFs ability to adapt to the “ever changing” blue bin
• Provides data to encourage product stewardship
• Patented process with a demonstration facility in Los Angeles, CA
What is a Secondary MRF?

Existing MRF “A”
Existing MRF “B”
Existing MRF “C”
Existing MRF “D”
Existing MRF “E”

Secondary MRF

Feedstock & Fuels

Direct-to-mill commodities

Properly managed residual waste

Any mixed materials

• #3-7 mixed plastics
• Machine yield loss

Mixed Waste Paper
Ferrous Metal
Non-Ferrous Metal
PET Bottles
HDPE/LDPE
PP
PS/EPS
PLA
PET Thermoforms
Aseptic Cartons
PETG
PVC

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Impact!

- **Blue Bin Accountability** for ~25 million consumers!
- Extends existing MRFs *ability to adapt* to the “ever changing” blue bin
- Reduces *greenhouse gas* generation by 330,000 tons CO$_{2}$eq
- Reduces leakage to the *marine environment* by managing mixed materials domestically
- Creates 138 direct *clean technology jobs*
- Provides data to encourage *product stewardship*

Blue Bin Accountability - sorting to recover direct-to-mill commodities and managing residual wastes responsibly - can be achieved for less than $3 per household - *equivalent to the cost of 1 cup of coffee per month*
Our mission is to provide “Blue Bin Accountability” to ensure that material recovery is maximized and all waste is managed responsibly.
Our Team

Mike Centers
• Founder and owner of Titus MRF Services
• Invented the Secondary MRF Process
• Executive experience at Strategic Materials (glass recycling) and TOMRA (sorting systems)
• Harvard MBA, West Point concentration in Operations Research
• Expertise in all aspects of material recovery, including policy, partnerships, operations, maintenance, processes, equipment, materials, and sales

Scott Farling
• Founder and owner of Scott Farling Recycling & Materials Management
• Passionate about waste prevention and material recovery
• Clean-tech startup experience at MBA Polymers and Agilyx Corporation
• Penn State Chemical Engineer
• Expertise in recovering value from complex waste streams, including business development, process optimization, equipment design, and waste plastics research
Our Plan

• Develop three Secondary MRFs

• Provide a positive return to our investors

• Solve challenges for our stakeholders and the environment

17% IRR

330K tons CO$_2$eq

138 direct jobs
## Financial Assumptions

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>PNW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume (TPM)</td>
<td>8,300</td>
</tr>
<tr>
<td>Processing Fee ($/ton)</td>
<td>$111</td>
</tr>
<tr>
<td>Revenue Share ($/ton)</td>
<td>$28</td>
</tr>
<tr>
<td>Net Cost to MRF ($/ton)</td>
<td>$83</td>
</tr>
<tr>
<td>Landfill Rate ($/ton)</td>
<td>$75</td>
</tr>
<tr>
<td>Net Value to MRF ($/ton)</td>
<td>($8)</td>
</tr>
</tbody>
</table>
Continued Growth Strategy – Network

- NEWCO
- First three Secondary MRFs will service the West Coast
- Next ten Secondary MRFs will increase service area to 17 of the top 20 combined statistical areas

1.43M tons of CO$_2$eq
• The larger our network of Secondary MRFs, the greater our ability to **develop markets** by producing truckload quantities of additional commodities, feedstock materials, and fuels.

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Truckload Quantities</th>
<th>New Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Volunteer Producer Responsibility (VPR)</td>
<td>• EPS/PS</td>
<td>Cement Kilns</td>
</tr>
<tr>
<td>• Zero Waste Plan</td>
<td>• PLA</td>
<td></td>
</tr>
<tr>
<td>• Volunteer Producer Responsibility (VPR)</td>
<td>• SRF</td>
<td></td>
</tr>
<tr>
<td>• Zero Waste Plan</td>
<td>• Competitive $/BTU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reduced GHG Generation vs. Coal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Diversion Credits</td>
<td></td>
</tr>
</tbody>
</table>
To Build the PNW Secondary MRF...

- Supply Agreements from all primary MRFs in the region
  - All machine yield loss and plastics not sorted by type
- Assistance with site selection and permitting
- Grants in exchange for jobs and environmental benefits
Want to learn more...

Contact Us:

Mike Centers          Scott Farling
mccenters@titusservices.net   scottfarling@gmail.com
(925) 548-3093       (415) 810-9454

Visit Us:

Secondary MRF Demonstration Facility, Los Angeles, CA
Existing Research & Further Study

Lisa Sepanski, King County Solid Waste Division
Market Research and Studies

• Oregon DEQ Research Projects
  • Mixed Paper Recycling Markets (Moore and Associates/Recycling Partnership)
  • Plastics Recycling Markets (More Recycling)
  • Market Development Policies/Incentives (Reclay StewardEdge)

• Sustainable Materials Management: A Life Cycle Approach to Reducing Northwest Waste Stream, Evergreen State College Sustainable Infrastructure Study

• Initiative to Illuminate Successful USA Recycling Market Development Practices and Activities, RSE Sustainable Product Solutions
Wrap Up & Next Steps

• Action items, recommendations & take-aways

• Next meeting: *Creating Demand for Recyclable Materials & Market Development*

**Date:** August 24, 9:00am – 11:00am

**Location:** Kirkland City Hall, 123 5th Ave, Kirkland, WA

**Parking:** Free parking on surrounding side streets and neighborhoods

**Room:** Peter Kirk Room
<table>
<thead>
<tr>
<th>Date</th>
<th>Topics Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 30</td>
<td>Task Force Goals; Responsible Recycling Framework; Current Conditions; Communications</td>
</tr>
<tr>
<td>June 1</td>
<td>Curbside Materials and Communications</td>
</tr>
<tr>
<td>June 18</td>
<td>Contracts, Waivers, Surcharges</td>
</tr>
<tr>
<td>July 18</td>
<td><strong>Fiber &amp; Plastics</strong>&lt;br&gt;- Fiber Processing (Domestic Processing and Markets)&lt;br&gt;- Plastic Processing (Domestic Processing and Markets)</td>
</tr>
<tr>
<td>August 24</td>
<td><strong>Creating Demand</strong>&lt;br&gt;- Legislative and Policy Option (Create Demand for Recycled Feedstock)&lt;br&gt;- National and Private Sector Efforts/Opportunities (Create Demand for Recycled Feedstock)</td>
</tr>
<tr>
<td>September 19</td>
<td><strong>Financing &amp; Infrastructure</strong>&lt;br&gt;- Financing Options (Responsible Recycling is Not Free)&lt;br&gt;- Recycling Infrastructure Systems (Quality vs Quantity, Domestic Processing and Markets, Responsible Recycling is Not Free)</td>
</tr>
<tr>
<td>October 26</td>
<td><strong>Possible Focus on Legislation/Revisit &amp; Confirm Task Force Recommendations</strong></td>
</tr>
<tr>
<td>November 15</td>
<td><strong>Final Recommendations &amp; Next Steps</strong></td>
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