Glossary of Terms

**ADST** - Air Dry Short Tons

**ADMT** - Air Dry Metric Tons

**ODMT** - Oven Dry Metric TOns

**ONP** - Old Newspapers including; Overissue, Source Separated, MRF Generated.

**OP** - Office Papers

**MIX** - Mixed Paper

- Primarily from Single Stream Residential Programs

**OCC** - Old Corrugated Containers

**TMP** - Thermal Mechanical Pulp

- Process used to take wood ships and separate into individual fibers using mechanical equipment combined with temperature

**UCFS** - Paper Made from Bleached Kraft fibers
# NORPAC Track Record of Innovation & Growth

## Machine Start-up Key Refurbishments

<table>
<thead>
<tr>
<th>Decade</th>
<th>Events</th>
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<tbody>
<tr>
<td>1970's</td>
<td>NORPAC founded as a JV between Nippon Paper and Weyerhaeuser</td>
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<tr>
<td></td>
<td>Paper Machine 1 and TMP1 Start-up</td>
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<tr>
<td>1980's</td>
<td>Paper Machine 2 and TMP2 Start-up</td>
</tr>
<tr>
<td></td>
<td>1991</td>
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<tr>
<td></td>
<td>Paper Machine 3 and Deink Facility Start-up</td>
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<td></td>
<td>Paper Machine 2 Gate Roll Size Press Upgraded</td>
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<tr>
<td>2000's</td>
<td>Paper Machine 1 Rebuild</td>
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<tr>
<td>2010's-Current</td>
<td>TMP1 Chip Pretreatment and Interstage Screening Upgrade</td>
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<tr>
<td></td>
<td>TMP2 Chip Pretreatment and Interstage Screening Upgrade</td>
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## New Product Introduction

<table>
<thead>
<tr>
<th>Year</th>
<th>Products</th>
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<tbody>
<tr>
<td>1979</td>
<td>Launch of Standard (30#, 32#) and Letterpress Newsprint</td>
</tr>
<tr>
<td>1981</td>
<td>PM2 Named World’s Fastest Newsprint Machine</td>
</tr>
<tr>
<td>1988</td>
<td>Commercial Launch of Low Brite Publication Products</td>
</tr>
<tr>
<td>Early 90's</td>
<td>Launch of Various Hi Brite Publication Products</td>
</tr>
<tr>
<td>1991</td>
<td>Lightweight (27.7#) Newspaper Published</td>
</tr>
<tr>
<td>1996</td>
<td>Super Bulky Pub. Recycled Book Launch</td>
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<tr>
<td>2004</td>
<td>Book Products Introduced</td>
</tr>
<tr>
<td>2007</td>
<td>Recycled Book Product Launch</td>
</tr>
<tr>
<td>2008</td>
<td>Blue Book Product Reunched</td>
</tr>
<tr>
<td>2009-2013</td>
<td>92 Bight UCFS Sub. and Intl. Hi Brite Product Introduced</td>
</tr>
<tr>
<td>2012-2013</td>
<td>Commercial Launch of Natural Choice and 24.5# Newspaper Product</td>
</tr>
<tr>
<td>2015</td>
<td>Commercial Launch of ORCA UCFS Copy paper</td>
</tr>
<tr>
<td>2018</td>
<td>Successful Launch into the Packaging Products Sector with Medium, Liner &amp; Bag</td>
</tr>
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</table>

## Awards

<table>
<thead>
<tr>
<th>Year</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>PM2 Named World’s Fastest Newsprint Machine</td>
</tr>
<tr>
<td>1981</td>
<td>Named Supplier of the Year by Dow Jones in 1991 and 1992</td>
</tr>
<tr>
<td>1991</td>
<td>USA Today Newspaper Supplier of the Year</td>
</tr>
<tr>
<td>2008</td>
<td>PPFA Most Improved</td>
</tr>
<tr>
<td>2010, 2014, Q1 2016</td>
<td>Ranked #1 in Safety for all Pacific Coast Pulp &amp; Paper Mills by the Vigilant Group</td>
</tr>
<tr>
<td>2008-2013</td>
<td>Top Rated Newspaper Supplier by Independent survey</td>
</tr>
<tr>
<td>2009, 2010, 2014</td>
<td>PPFA Best Record</td>
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NORPAC Raw Material Story

Years 2003 - 2017
NORPAC has a long history of reporting the impacts of Single Stream Recycling beginning in 2004 with presentations to TAPPI (Technical Association of Pulp & Paper Industry), California Single Stream Roundtable, SWANA, EPA Region 10 Commingling Best Practices, AOR, WSRA Annual Conference, WSRA WRED Events, OR DEQ, WA DOE Southwest Region Single Stream Best Practices,

Received national Recognition from TAPPI in 2005 for technical paper on negative impacts of Single Stream Recycling on mill operations & costs

Most Recent -

• Presentation to Association of Oregon Recyclers (AOR) November 2017 and National Recycling Conference May 2017
Key Points in Supply History

- Single Stream collections negatively impacting NORPAC beginning 2001
- By 2011, as much as 97% of NORPAC Recycle Fiber Supply sourced from Single Stream collection programs
- NORPAC Made Strategic Decision to Move Away From ONP from Single Stream Programs and Began Using OP Grades in 2011
- Decision Supported Move into Book Grades With Recycle Content
- Current Fiber Mix is Comprised of Less Than 8% Material from Single Stream Programs.
- Remaining Supply from Single Source Programs Continues to Slide in Quality, Even with Pressure from China to Improve Quality
- Behaviors Learned from Single Stream Residential Programs are Now Effecting Office Collection Programs and Quality is Deteriating
- Secure Document Destruction Programs are Not Capable of Separating Non-Fiber or Non-Office Papers and Contribute to Declining Quality Office Paper Grades
Recycle Raw Material Quality

West Coast MRF’s Typically Not Aligned with Domestic ONP Customer Quality Needs

• “I do not have enough room to add more sorters to get to ONP 8 quality.”

• “My equipment supplier did not guarantee my quality would be equivalent to ONP 8.”

• “I adjusted my process to get more HDPE containers out due to high market prices. Sorry about your paper quality.”

• “Sorry about your quality, we had to run harder to keep up with material after being down for a day.”

• “We are running harder to keep up with the increase volume from the curbside programs.”

• “I get the same price for Mixed Paper in the Export market compared to ONP 8 on the Domestic market and I do not have to spend additional money cleaning it up.”

• “Why should I add labor costs at my facility creating a lower margin for my operations just to sell to a Domestic customer?”
Recycle Raw Material Quality

ADST Pulper Rejects per ADST Pulper Feed

% Pulper Rejects of Pulper Feed Tons

Effect of Continued Growth of Single Stream Recycling Programs Across North America

Reduced ONP Ratio and Replaced With Office Paper Grades

1996 May-02 Oct-02 Mar-03 Aug-03 Jan-04 Jul-04 Jan-05 May-05 Aug-05 Jan-06 May-06 Aug-06 Jan-07 May-07 Aug-07 Jan-08 May-08 Aug-08 Jan-09 May-09 Aug-09 Jan-10 May-10 Aug-10 Jan-11 May-11 Aug-11 Jan-12 May-12 Aug-12 Jan-13 May-13 Aug-13 Jan-14 May-14 Aug-14 Jan-15 May-15 Aug-15 Jan-16 May-16 Aug-16 Jan-17 May-17

NORPAC
QUALITY. CONSISTENCY. INNOVATION.
Increased ONP Grade contamination caused by -
• More items added to program
• Higher run rate at MRF creating lower efficiency of process
• Increasing public trend of adding non-program items to recycling carts
Recycle Raw Material Quality

Decreasing ONP Grade contamination due to -

- Pressure from Domestic customers
- Business decision to limit risk of selling into Export market
- Running sort system at a pace to achieve Domestic customer expectations
Local Recycle Raw Material Quality Update

Recently Completed a Quick Evaluation of Local Single Stream ONP / MIX Quality

Key Observations –

• Pulper Yield loss = **Greater** than 15%

• Pulper Rejected Characteristics –
  • Heavy in film plastics
  • Small rigid plastic containers
  • Non Program items such as; cd’s, broken plastic packaging items, etc.

• Process Loss was high in glass content which overwhelmed and plugged glass removal equipment

• Overall Yield Loss was close to 20%
Recycle Raw Material Quality

Effect of Continued Growth of Single Stream Recycling Programs Across North America

Reduced ONP Ratio and Replaced With Office Paper Grades

IF NORPAC were to continue using ONP type grade from Single Stream processors
Major Differences East of the Rockies

Program limited to items MRF know they can remove

Programs do not include/add items for which there is no market

Glass is typically not a program item in the Midwest.

Public has not developed poor recycling habits due to lower level of messaging

Municipalities/states do not have aggressive landfill diversion goals as compared to West Coast
Recycle Fiber Grades

ONP
Quality Declining Creating Large Negative Impacts to Processing Costs and Setting Direction Business to Exit Recycle Fiber Grades Where Possible - Newsprint

OP
Quality on a Similar Path as ONP Creating Similar Decisions for Business
Limit Recycle Content in Hi Brite Grades
At a minimum – Keep Glass out of Programs

Desirable Outcome – Create a two bin system
• Fiber
• Non-Fiber
NORPAC Raw Material Story

Year 2018
Fast Forward 10 Months

NORPAC Business Diversification –
• Successfully entered the Packaging Sector
  • Using available fiber supply –
    • OCC
    • Curbside MIX Paper
• Packaging grades include but not limited to –
  • Medium
  • Liner
  • BAG
Fast Forward 10 Months

Same Challenges

- Poor Yield – 80% Yield = 20% of what is purchased is sent to the landfill from items not part of recycling programs or cannot be separated by MRF’s.
  - Clamshells
  - Film plastics
  - Hose sections
  - Fence Posts
  - Footballs
  - Tennis Shoes
**MIX**

- With an **AVERAGE Yield Loss at Pulper of 20%**-
  - Fill **12 each of 40 Cu Yd Drop Boxes in a 24 Hour Period**
  - All Drop Box Contents are Landfilled
  - Typical Monthly Production results in **79 Drop Boxes (640 ADST) Sent to Landfill**
Recycle Fiber Grades – 10 Months Later

**MIX**
- Now the Primary Grade Purchased for NORPAC
- Quality Will Continue to Have a Large Negative Impact to Processing Costs Under Existing Program Designs
- The Current Market Pricing Helps Defer this Large Negative Financial Impact

**OCC**
- Similar Concerns With Contaminants and Negative Financial Impacts

**ONP and OP**
- No Change in Concerns as Stated 10 Months Prior
Recycle Fiber Grades - 10 Months Later

What Makes MIX a Viable Grade Now vs. Earlier –

- Compare this price drop and related Yield Loss to following scenarios -
  A. 2008 – 2017 Gas prices at $4.80/gal and with 20% Yield Loss on consumption = $5.76/gallon. Decide to not take your $50,000 SUV on your family vacation trip across the country so the vehicle remains parked and used only to get groceries.
  B. 2018 Gas price drop 106%. With a 20% Yield Loss on consumption you can now afford to drive your SUV on that family vacation across the country.

This has provided NORPAC an opportunity to enter into the Packaging Sector, and a financial incentive to develop this new grade for the business.

<table>
<thead>
<tr>
<th>RISI Index (FOB Supplier)</th>
<th>US AVG</th>
<th>Export to Asia (LA)</th>
<th>PNW Domestic</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 2017</td>
<td>$60</td>
<td>$104</td>
<td>$42</td>
</tr>
<tr>
<td>August 2018</td>
<td>$-0.30</td>
<td>$28</td>
<td>$-2.50</td>
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</tbody>
</table>
COLLECTION & PROCESSING
• At a minimum – Keep Glass out of Programs

• Desirable Outcome – Create a two bin system
  • Fiber
  • Non-Fiber (No Glass)

Allows MRF greater opportunity to separate fibers from non-fiber included by program participants (Residential and Commercial)

MIX Paper grade needs to be affordable to compensate for high Yield Loss