

# MATERIAL REUSE PROGRAMS PLYMOUTH, NORTH CAROLINA

OVERVIEW WITH NC's ENVIRONMENTAL  
STEWARDSHIP INITIATIVE PARTICIPANTS

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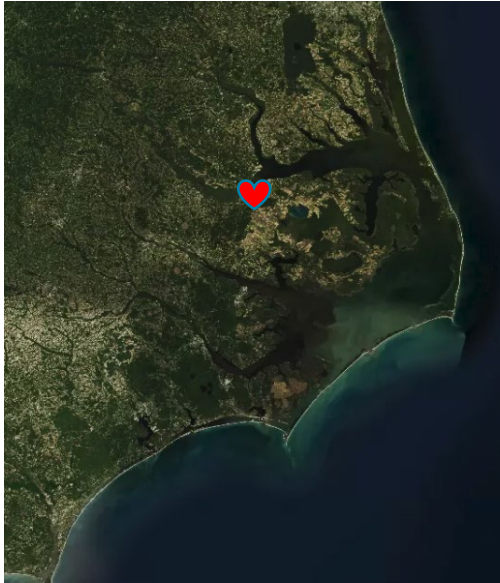
Domtar

# WHO IS DOMTAR IN PLYMOUTH, NC?

*A manufacturer of fluff pulp for the absorbent hygiene products industry, and an active member of the local community and Forest Products Industry*



# DOMTAR PAPER COMPANY, LLC – PLYMOUTH, NC





# DOMTAR-PLYMOUTH, OPERATIONS OVERVIEW

- 390,000 Air Dry Metric Tonnes annual pulp production capacity
- Approximately 330 employees
- Estimated regional economic impact of \$667 million (USD)
- Contains the typical operating areas for the industry:
  - Woodyard, Raw Water Treatment, Electrical and Steam Generation, Chemical Recovery, Chip Cooking, Pulp Drying, Wastewater Treatment, Packaging/Warehousing/Shipping
- Sits on a site of ~4,400 acres adjacent to the Roanoke River  
(of which industrial footprint ~ 2,500 acres)
- Operates an onsite Subtitle D landfill with collected leachate treated in the onsite wastewater treatment system
- Generates residuals typical for the industry:
  - Wood handling residuals
  - Boiler ash (from combustion of biomass)
  - Grits and Dregs
  - Lime/Lime Mud
  - Wastewater solids



# OUR “FORMER” CHALLENGES WITH MANAGING MANUFACTURING RESIDUALS

- Unsustainable practice of landfilling the majority of mill residuals
  - Historical disposal rate of ~ 200 wet tons/day
  - Landfill cell construction, continuous operations, maintenance and long-term care:
    - Capital costs
    - On a track of building a new cell every 5 years
    - Maintenance and operating costs
    - Landfill space demands
    - Regulations (permitting, monitoring, reporting)
- Lack of available and more cost-effective options for managing residuals other than disposing of them in a permitted landfill
  - Recycling costs money too!



# THE GAME CHANGERS

- Eliminating coal consumption in on-site power boilers (2010).
  - No more coal ash, only wood ash.



- Discovering an innovative and accessible, material handling resource (2012)
- Applying soil science
- Engaging regional farmers
- Establishing a method to recover recycling costs
- **Convincing mill management to try something different!**



# SUCCESSFULLY STARTING A BENEFICIAL REUSE PROJECT

- Engaged a resource that applies soil science, ingenuity and material handling expertise to beneficial reuse efforts with manufacturing residuals
- Tested mill residuals over a year to verify viability of pursuing a beneficial reuse project
  - Utilize services of State agricultural lab
- Determined our target reuse opportunity and product recipe(s)
  - Named it
  - Registered it with the Department of Agriculture
- Developed on-site management plan for safe and compliant operations
- Developed a financial plan to recover some of program costs
  - Cost of program based on production
  - Cost to farmers & farmer payment plan
  - Credit back to company
- Effectively marketed the product
  - Approved for agricultural use, and apply to various crops: corn, wheat, peanuts, sage, soybeans, cotton
  - Local Ag Extension Service and the Farm Bureau
  - One-on-one with farmers
  - Printed and web-based access to information and ordering



# MAKING A SUSTAINABLE DIFFERENCE

- “K-lime” was introduced in the Fall of 2013, is preferred by regional farmers over commercial fertilizers and there continues to be strong demand for the product
  - Provides liming value along with nitrogen, potassium (guaranteed) and organic matter
- K-lime reduced the mill’s daily landfill disposal by more than 95% since 2013
- K-lime has enabled the mill’s landfill site life to be extended and capital costs associated with new cell construction to be deferred by ~ 30 years
- The K-lime project is an award-winning effort, which has received praise from customers and environmental stakeholders while achieving the company’s sustainability goals
- D-Lime was invented in 2017, to move more product when quality of constituents vary:
  - Potassium concentration not guaranteed
  - Lower costs to farmer
- K-lime is a star feature in Domtar’s educational outreach activities with local schools and colleges

environmental  
**LEADER**



**2015 Award  
for Innovative  
Sustainability:  
K-lime Project**





# D & K-LIME IN MOTION



# OTHER CONSIDERATIONS FOR A SUSTAINABLE PROGRAM

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- Develop a Quality Assurance/Quality Control Plan to remain accountable to buyers and ensure no risks to the environment, this includes developing an Safety Data Sheet for the material reuse product.
- Continuously monitor the product to ensure its quality and safety.
- Work with applicable regulatory agencies to ensure the staging of beneficial reuse operations are appropriately covered with by required permits.
- Register the product with the state agricultural agency.
- Clear any air permitting concerns from use of fuel-fired screens or other equipment involved in the project, with air quality authorities.
  - The NC Department of Air Quality (DAQ) required the mill demonstrate emissions were insignificant and we include the emissions in our annual Air Emissions Inventory.
- As a best practice: Stage operations to minimize/eliminate stormwater runoff.



# A VIEW OF THE D AND K-LIME STAGING AND BLENDING OPERATIONS



Contained within the leachate-controlled footprint of the No. 3, Subtitle D landfill



# MARKETING/OPERATIONAL CONSIDERATIONS

- BE FLEXIBLE!!
- Pay attention to crop prices, because it correlates with the financial health of the farmers.
- Be aware that prices for commodities are always changing and so are nutrient prices.
  - May need to adjust rates accordingly and payment terms.
- Remember that the characteristics of the by-product streams fluctuate, which can impact the final material re-use product and/or its value.
- Monitor remaining space utilization trends and compaction performance when significantly reducing waste to the landfill.
  - The impacts may be surprising!





# ANOTHER SIGNIFICANT MATERIAL RE-USE EFFORT

## Lime Mud Reclaim

- The Challenge: How best to manage lime mud associated with the extended 2020 annual kiln outage (~36 days)
  - Estimated the lime mud disposal to onsite landfill from this event: ~141,000 ft<sup>3</sup> CaCO<sub>3</sub>
  - Compared to mill-wide annual average total disposal: ~10,100 ft<sup>3</sup>/year (equates to ~2000 tons/year)
  - Additional lime from the outage was too much to blend into D and K lime products to maintain product ratios
  - No local/regional resources found that could utilize the lime material
- Decided to store lime mud for reclaim
  - Considered the need to keep lime clean and dry
  - Utilized available onsite, former warehouse
  - Stored 5,200 tons (~86,000 ft<sup>3</sup>), which will take up to 2.5 years to reclaim
- Designed and installed a simple hopper & conveyor system to reclaim stored lime to the mud storage tank
  - Used simple agricultural implements: 125 ft covered conveyor and 8x10 ft vibrating, funnel hopper
  - Acquired approval from NC DAQ to construct and operate system – insignificant source
  - The process transfers stored lime to the hopper via a front-end loader, as needed for process lime makeup
  - This beneficial use offsets annual purchases of make-up lime (~200 tons per month)
  - It works best when the driest lime is reclaimed

# PLYMOUTH LIME MUD RECLAIM PROJECT



Storage

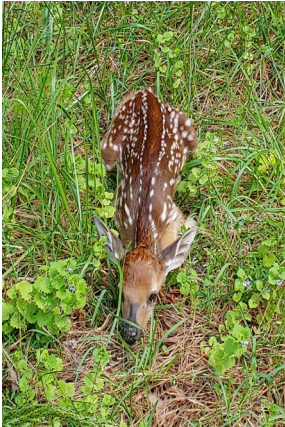


Hopper and  
Conveyor  
System





# SOME FUN PICTURES: OUR MILL WILDLIFE COMMUNITY







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# THE FIBER *of* Domtar

AGILE | CARING | INNOVATIVE

