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Chemical Recovery and Recausticizing Improvements: Increase White Liquor Production

Alex Moline
Process Engineer

AGENDA

- Dryden Mill Overview
- Liquor Cycle Challenges
- Online Liquor Analyzer Project
- Liquor Cycle Controls
- White Liquor Filter Controls
- Results

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THE FIRST HUNDRED YEARS

- Mill was built starting in 1912 and first pulp production was in 1913
- Mill expanded into paper in 1919 and by 1979 there was a sawmill, pulp mill, four paper machines and three sheeters on site
- In the early 1980s most of the old pulp mill was replaced, and two new paper machines were built
- Beginning in 2003 declining paper markets resulted in shutdowns of the sawmill, both paper machines and the converting operation; in 2009 the mill became a 100% softwood market kraftmill.

1913-2019

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EQUIPMENT HISTORY

- $250 million pulp and sawmill expansion in 1983
- $110 million installation of D1 machine (and finishing equip.) in 1984
- $175 million installation of D2 machine (& Will cut-size sheeter) in 1989
- $54 million chip handling and screening system completed in 1996
- $35 million cut-size sheeting expansion in April 1998
- $45 million rebuild of D2 machine in 2001
- $230 million Recovery Boiler and air emissions reduction in 2004
- $23 million boiler feedwater treatment and steam turbine in 2012

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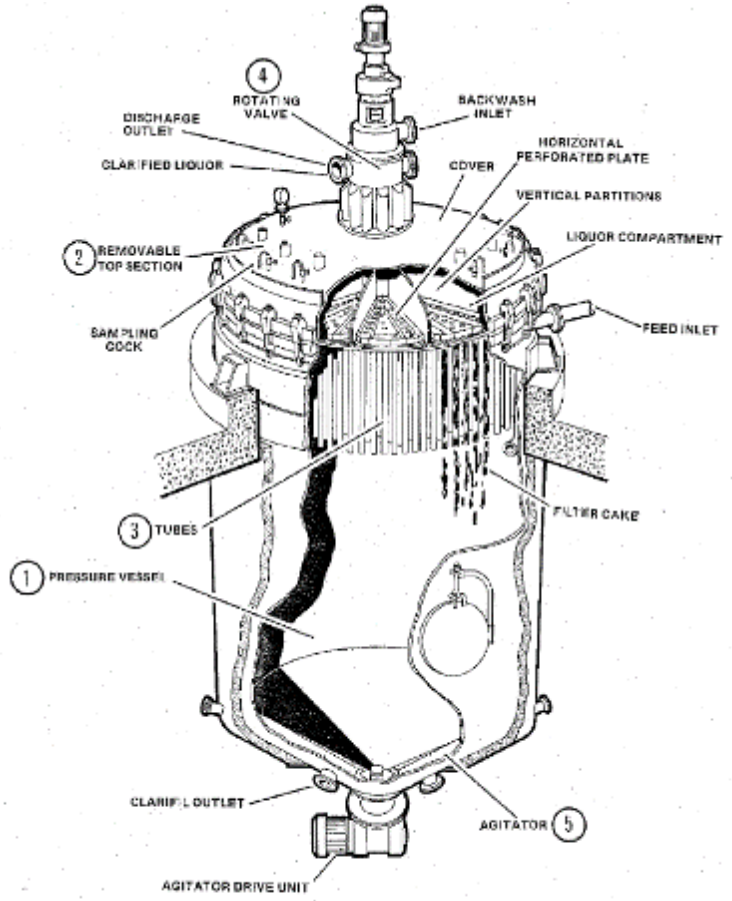
AGE OF EXISTING ASSETS

- 1954 - Coal Fired Power Boilers (hog fuel in 1984)
- 1959 - Lime Kiln
- 1979 - Black Liquor Evaporators
- 1982 - Single Vessel Kamyr Digester
- 1982 - Pulp Screening, Bleach Plant and Cleaner
- 1982 - Pulp Machine
- 1982 - Causticizing, WL filtering and storage
- 1989 - 37 MW Turbogenerator
- 1996 - Automated Chip Handling System
- 1997 - Chip Thickness Screening
- 2004 - Black Liquor Pre-evapsand Concentrators
- 2004 - No.4 Recovery Boiler
- 2012 - 15 MW Topping Turbine



CLARIFIL BASIC DESIGN

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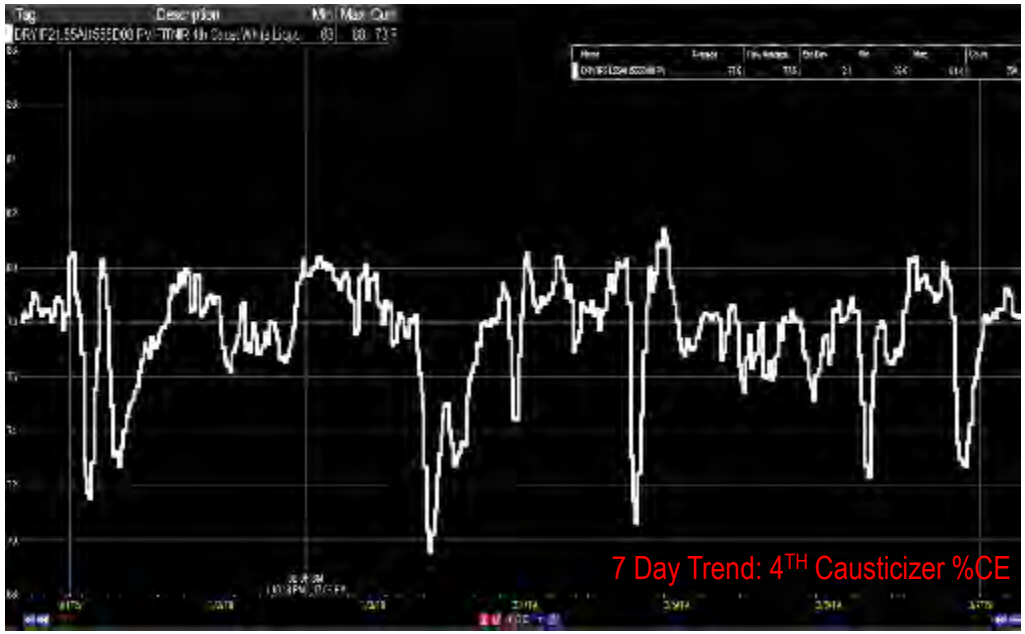
LIQUOR CYCLE CHALLENGES

- Low liquor test frequency and limited liquor cycle controls.
- High liquor cycle deadload and process scaling.
- High variability in liquor properties including RGL & CGL TTA, as well as WL EA and %CE.
- Operating at low %CE, due to high occurrence of overliming and plugging WL filters.
- Low WL filter efficiency.
- Low digester EA charge, cook quality impaired, lignin precipitation (bleach chemicals).

Online liquor analyzer + APC

Filter underflow controls



FT-NIR ONLINE LIQUOR ANALYZER OVERVIEW

FSS-RB

NIR Fibre optic cables

SRS

FSS-RC

- **FT-NIR Liquor Analyzer**
  - Utilize Near Infrared light
  - Measures liquor compositions from fundamental absorption of molecules
  - Connects via fibre optic cable to FSS at mill process location
  - Can accommodate up to 8 FSS
- **Field Sampling station (FSS)**
  - Located process area
  - Multiple streams capability (6)
- **Self flushing after each analysis**
  - Clears line to tie-in points
- **Self zeroing hourly**
- **Minimal maintenance requirement**

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ONLINE LIQUOR ANALYZER INSTALL

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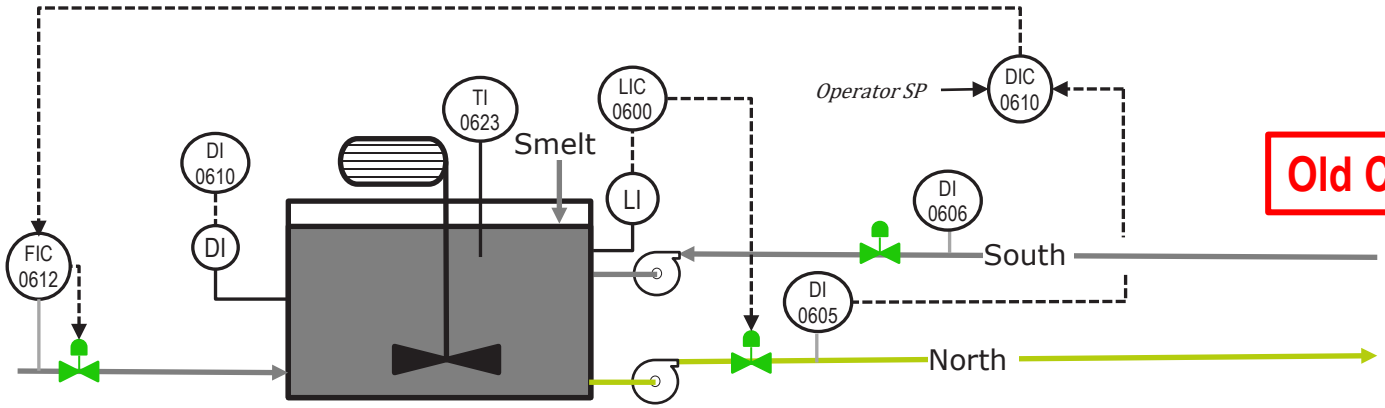
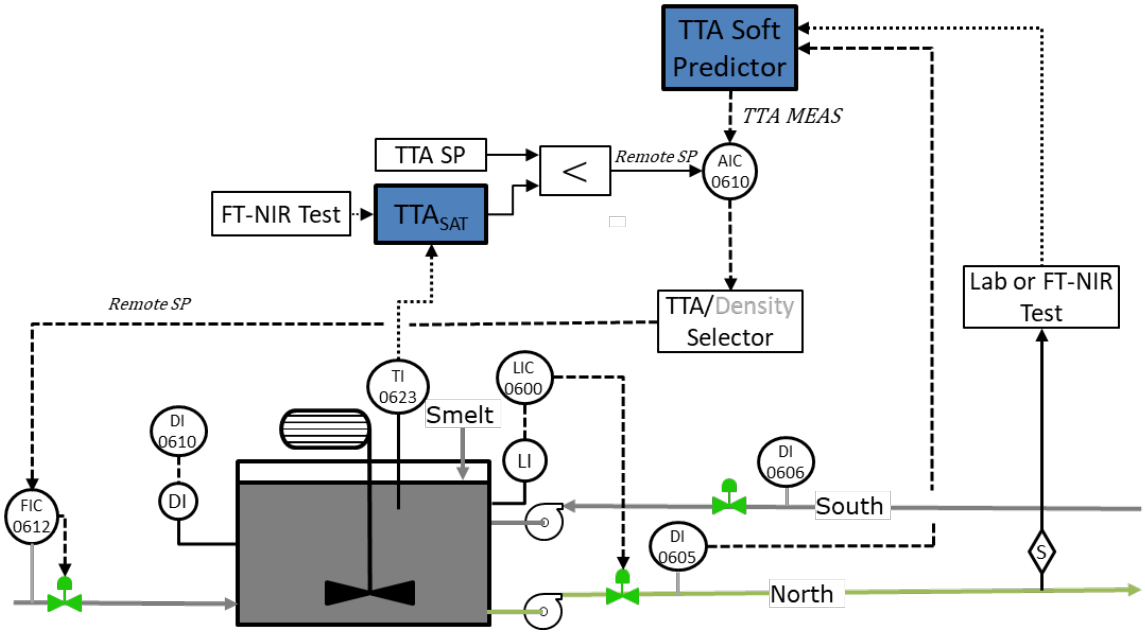
LIQUOR CYCLE CONTROLS (RGL TTA)



Old Control Strategy



New Control Strategy

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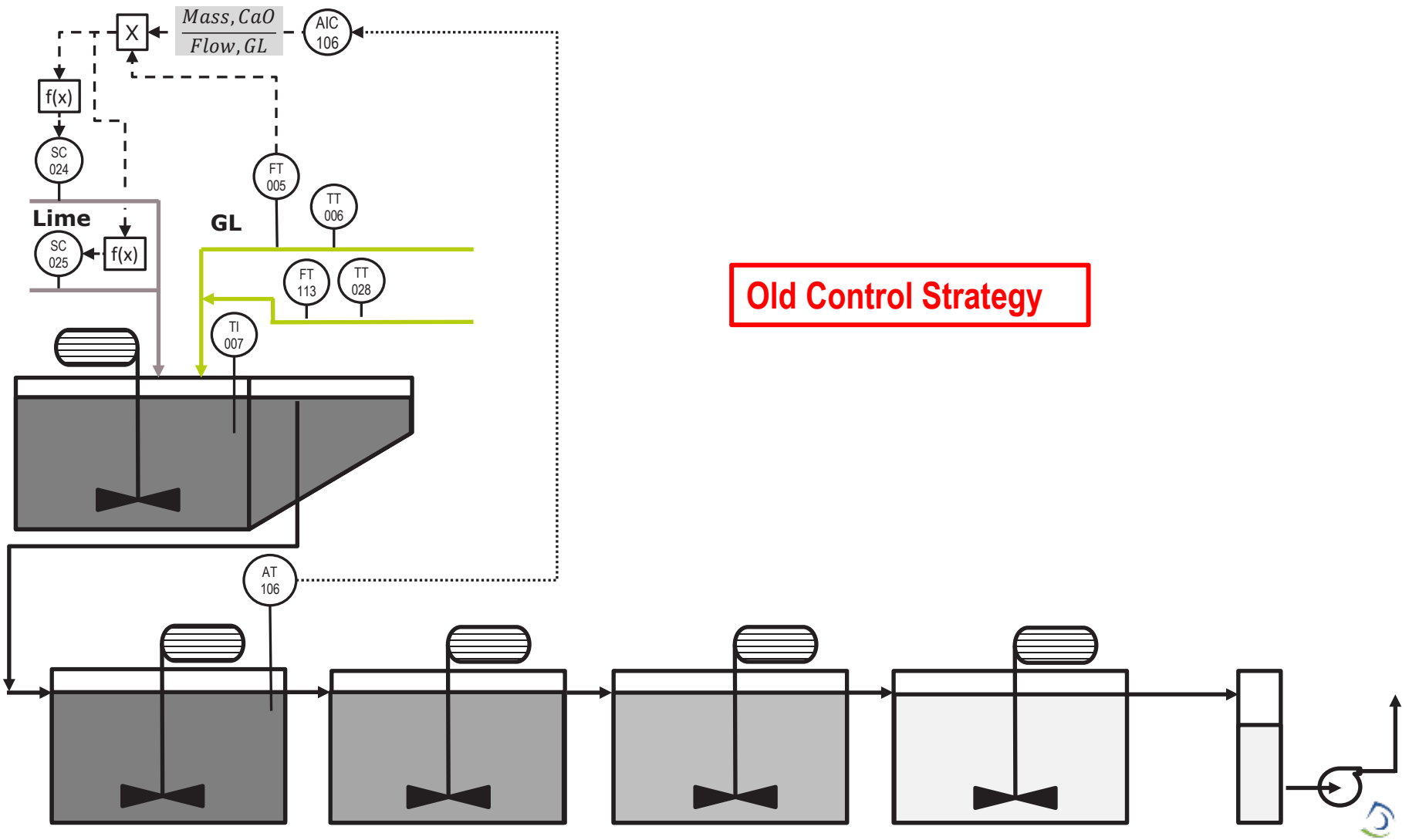
LIQUOR CYCLE CONTROLS (WL %CE)



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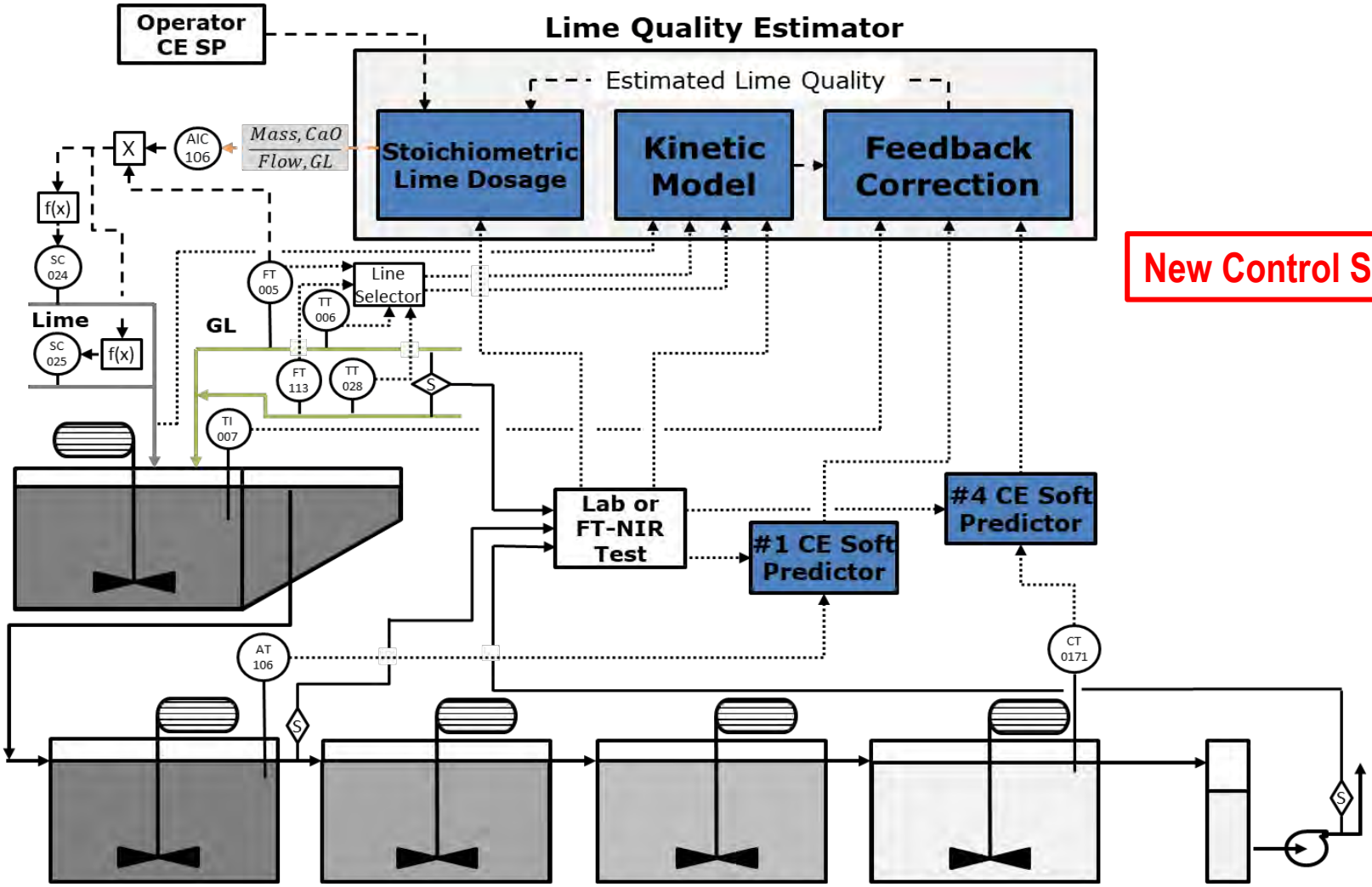

New Control Strategy

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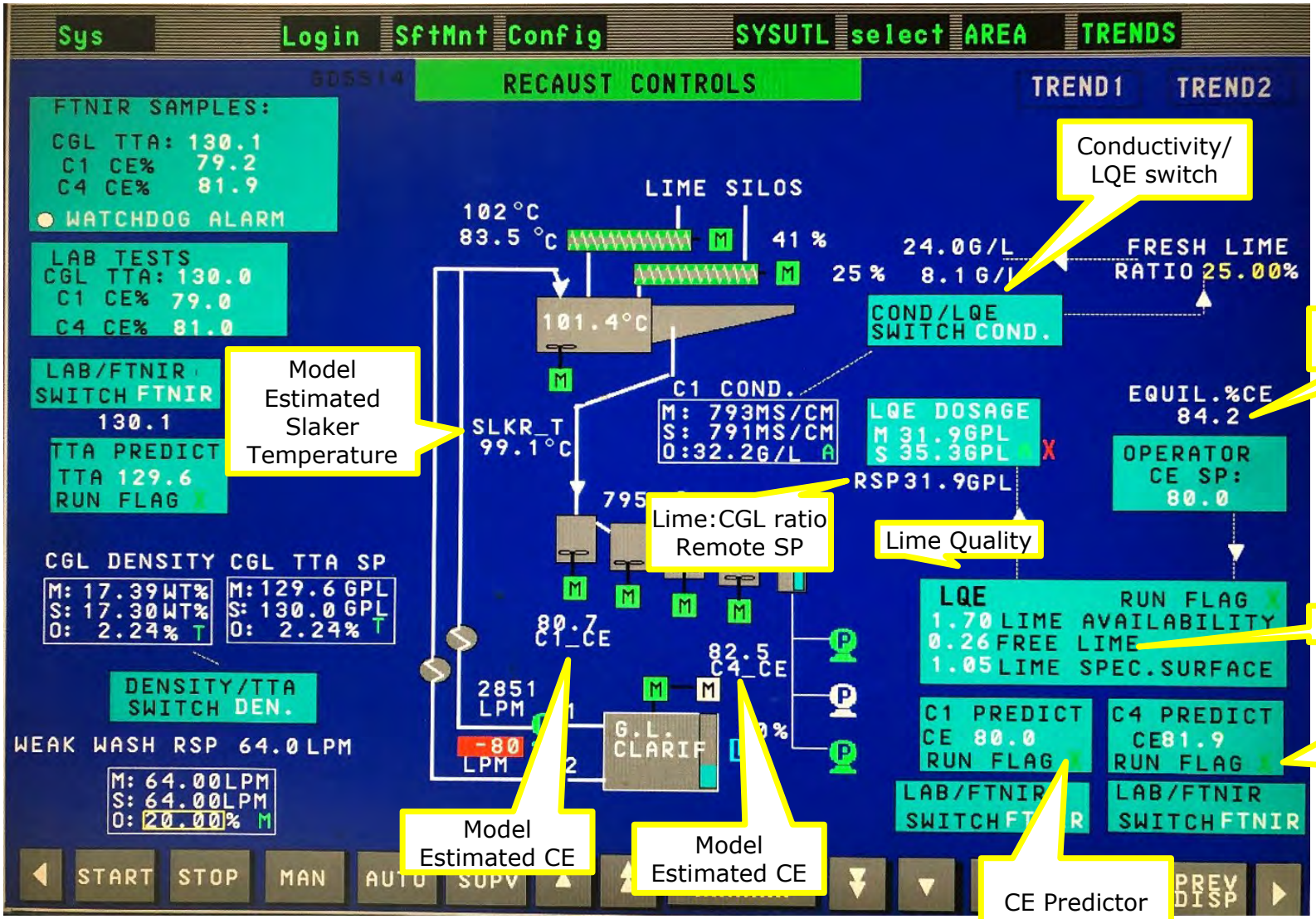

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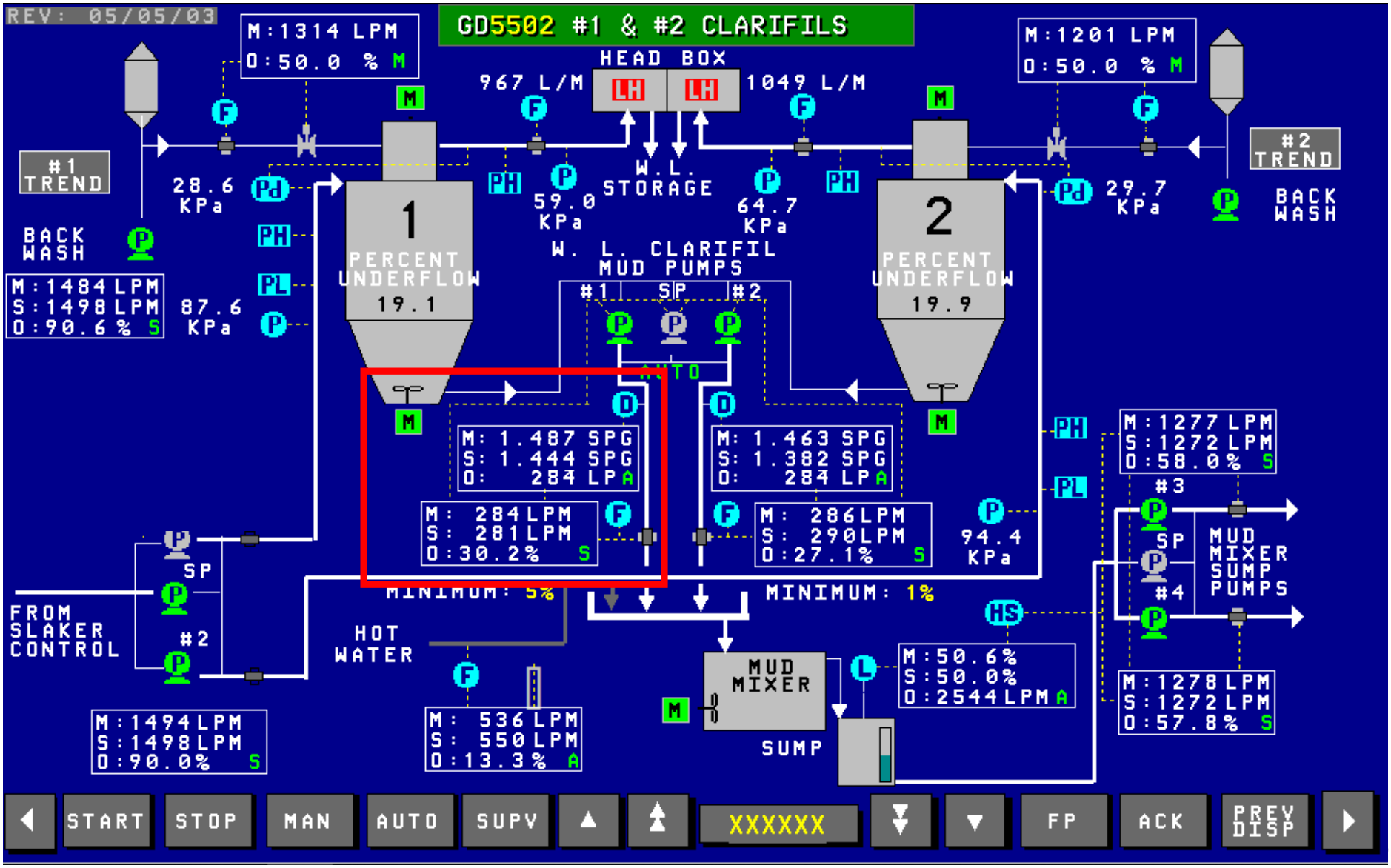
WL FILTER CONTROLS



RESULTS

TTA CONTROL

RGL and CGL TTA standard deviation reduced 40%

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WHITE LIQUOR %CE

Final White Liquor CE increase +1.9% points

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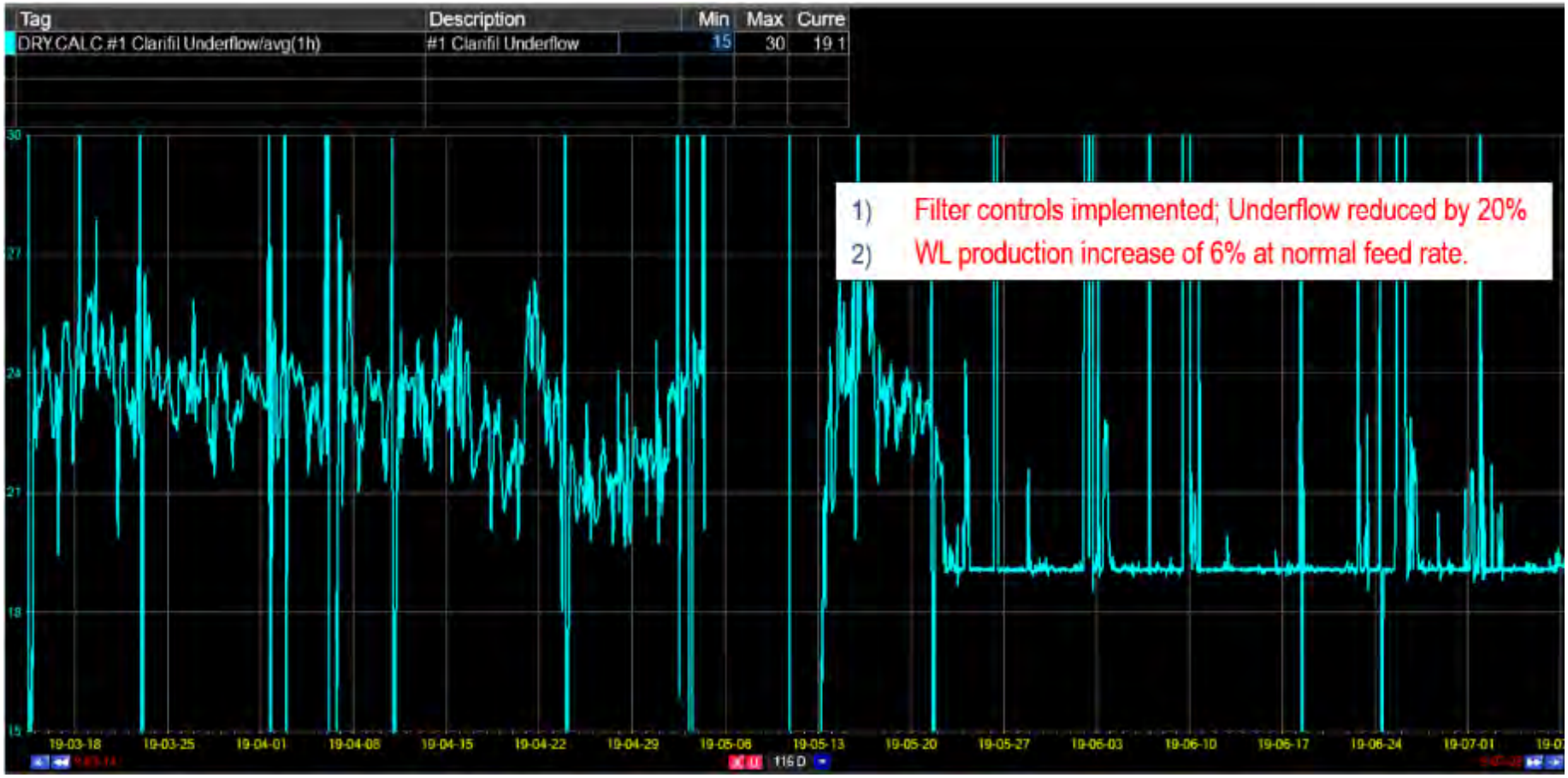
FILTER UNDERFLOW CONTROL



WL production per GL feed increased 6%

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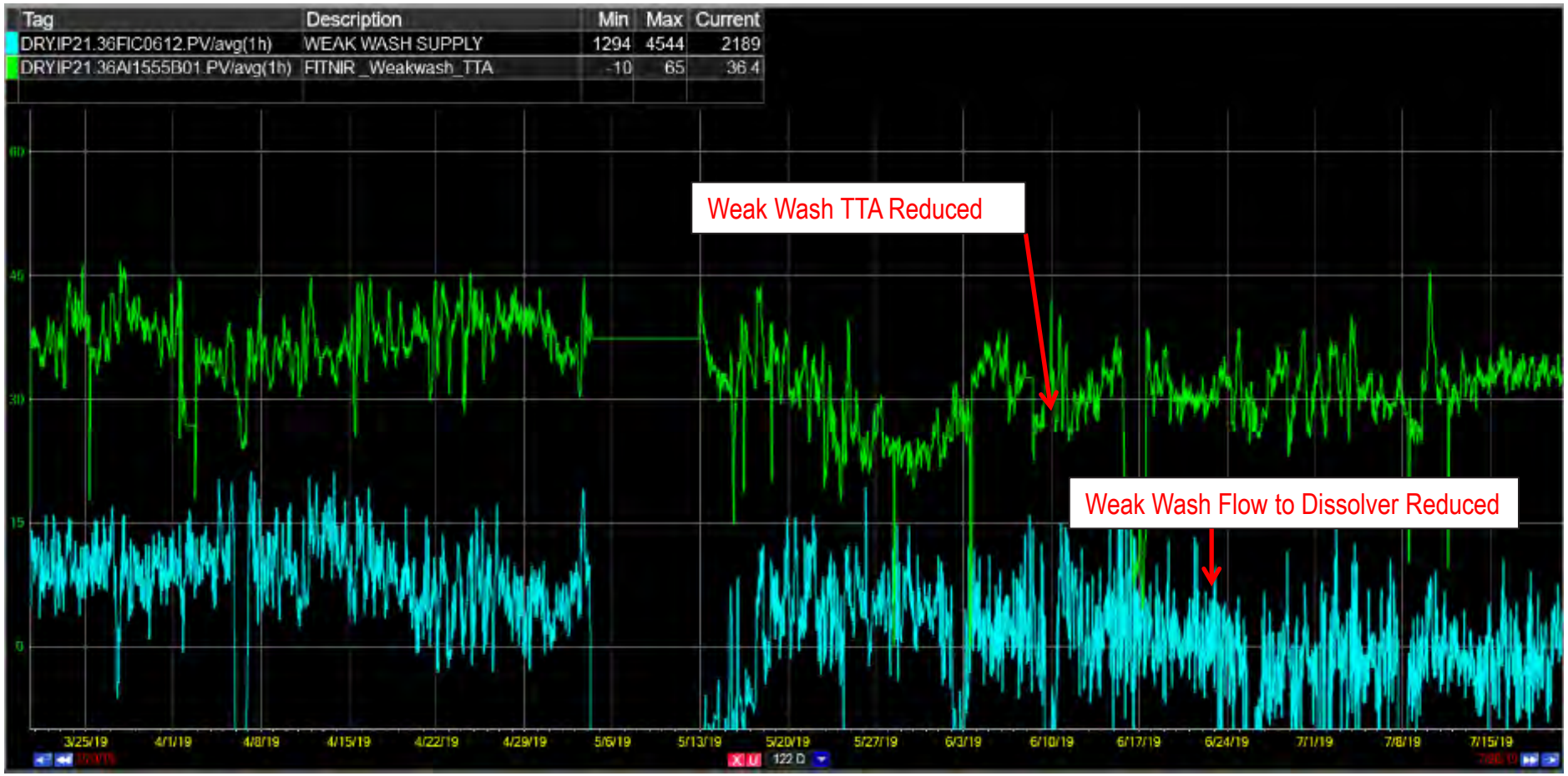
FILTER UNDERFLOW CONTROL



Lower WW TTA and flow reduces deadload

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TOP SEPARATOR SCALE DEPOSITS

Shutdown May 2018

Shutdown May 2020

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RESULTS SUMMARY

Metric	Manual Testing	With Analyzer
Frequency	Hourly	10-30 min
Liquor Measured	RGL, CGL, C1 WL	RGL, CGL, C1 WL, C4 WL, Dig WL, WW

Parameter	Before	After	Change
% CE (adjusted)	77.5%	79.4%	+1.9%
WL EA	90 EA Na20	92.5 EA Na20	+ 3 EA
Filter WL lpm/GL feed lpm	76%	81%	+5%
Weak wash TTA	36 TTA Na20	30 TTA	-6 TTA
Recaust EA Throughput			+9.5%

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THE FIBER *of* Domtar

AGILE | CARING | INNOVATIVE

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