Brightness Boosting in an HD with Hydrogen Peroxide

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PAPTAC Bleaching Committee

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VERSO

Turn to us.™

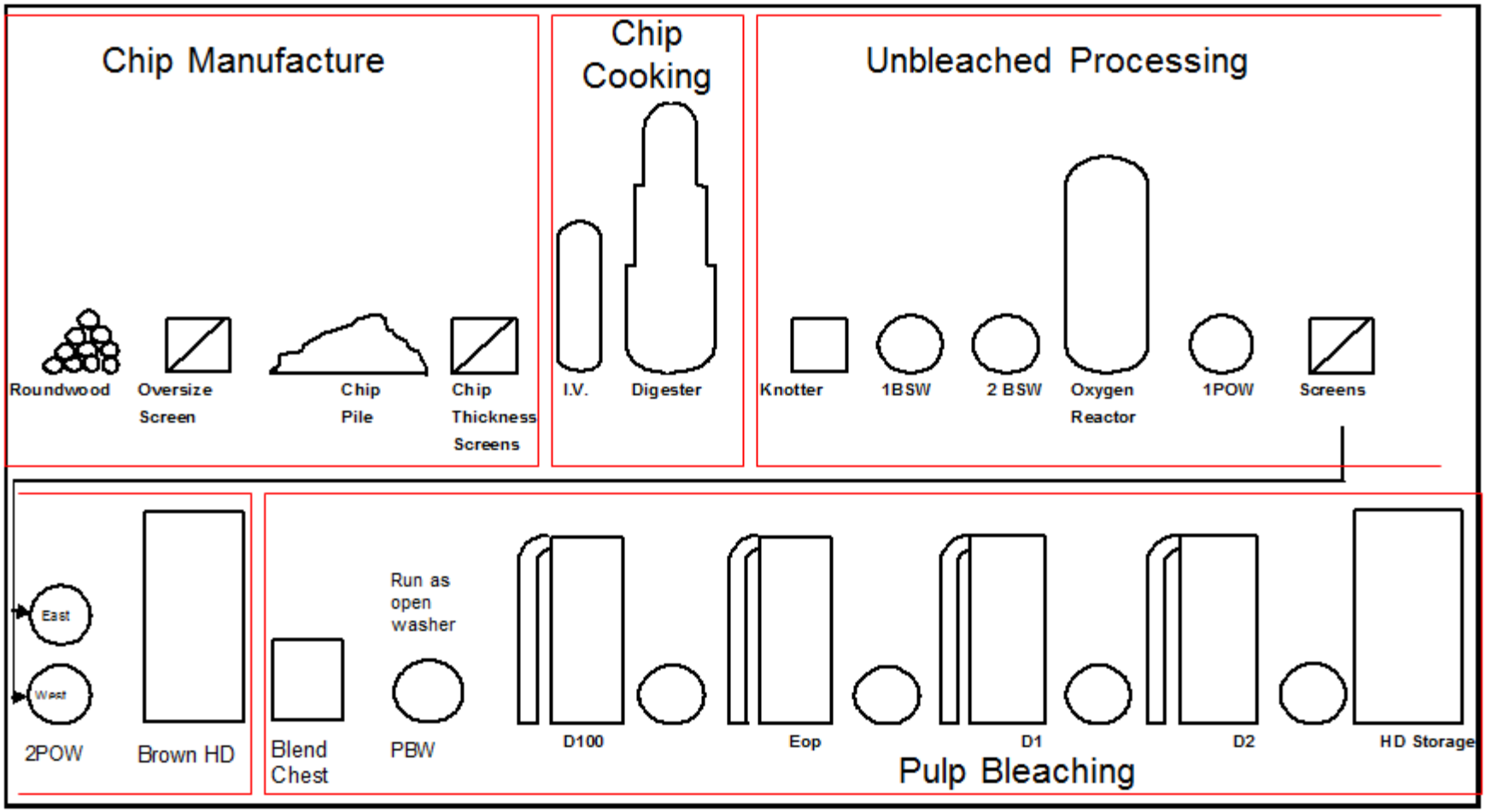
Presentation Outline

- Why do folks use Peroxide in HD's
- Quick intro to Quinnesec Fiberline
- How did we end up going HD Peroxide treatment
- Some information on our system
- Results from our Peroxide Treatment
- Optimization efforts
- Things to consider
- Questions

Why Use Peroxide Brightness Boosting

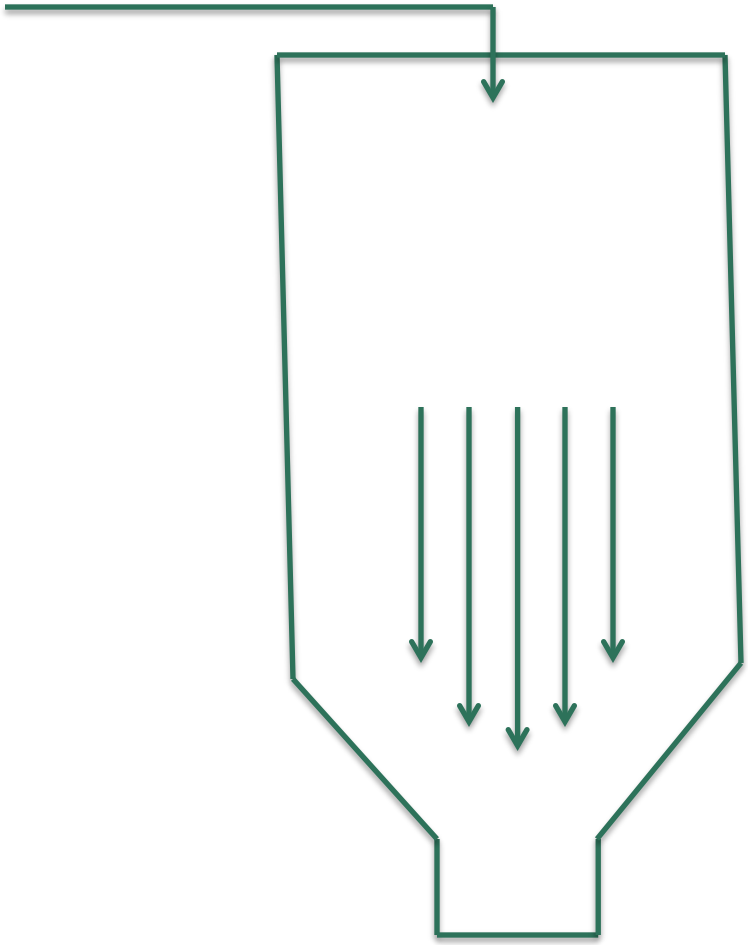
- Bleach plant retention time has dropped due to increased production rates and can’t make brightness
- ClO2 plant limitations
- Need higher brightness pulp and have run into a brightness ceiling
- Have high reversion between the last D stage and final dried pulp brightness

Quinnesec Fiberline



90 ISO brightness hardwood pulp

Quinnesec Bleached HD



Design is top entry pipe that drops straight into tower near the top

HD is very prone to channeling and once started tends to keep channeling

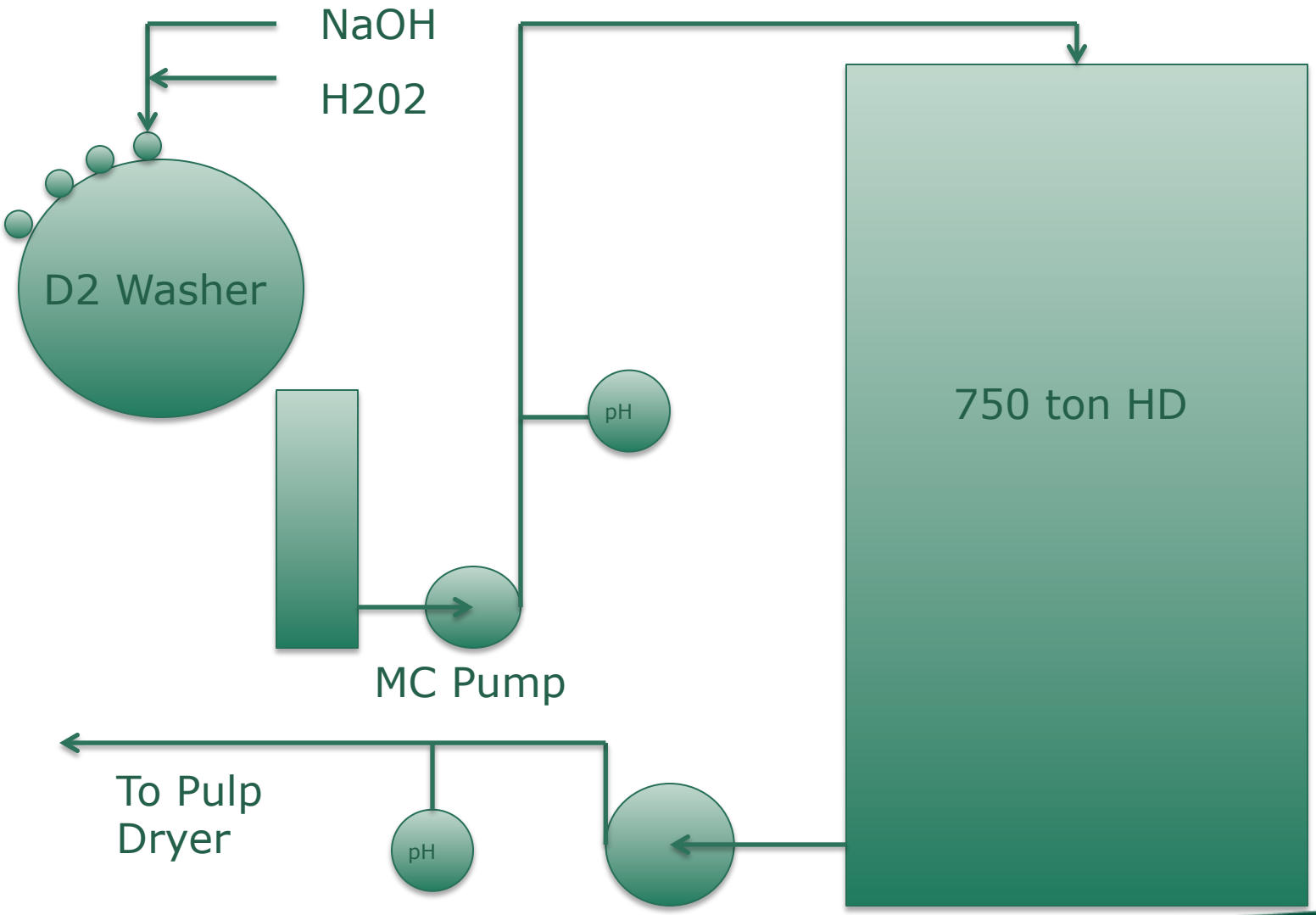
Why Did we Consider Peroxide in the HD

- Desired to raise final pulp brightness as measured off the Pulp Dryer from 90.0 ISO to 91+
- Cost savings opportunities during normal running

Options Evaluated to Raise Final Brightness

- Using more ClO2
  - Took a significant amount on the D2 Stage and ended up with significant residual ClO2 which affected Pulp Dryer corrosion and felts
- Post Bleaching Enzyme
  - Were able to boost the brightness, but not enough
- Hydrogen Peroxide
  - Required caustic to raise pH, but provided the needed brightness at a reasonable cost

Where H2O2 and NaOH are added

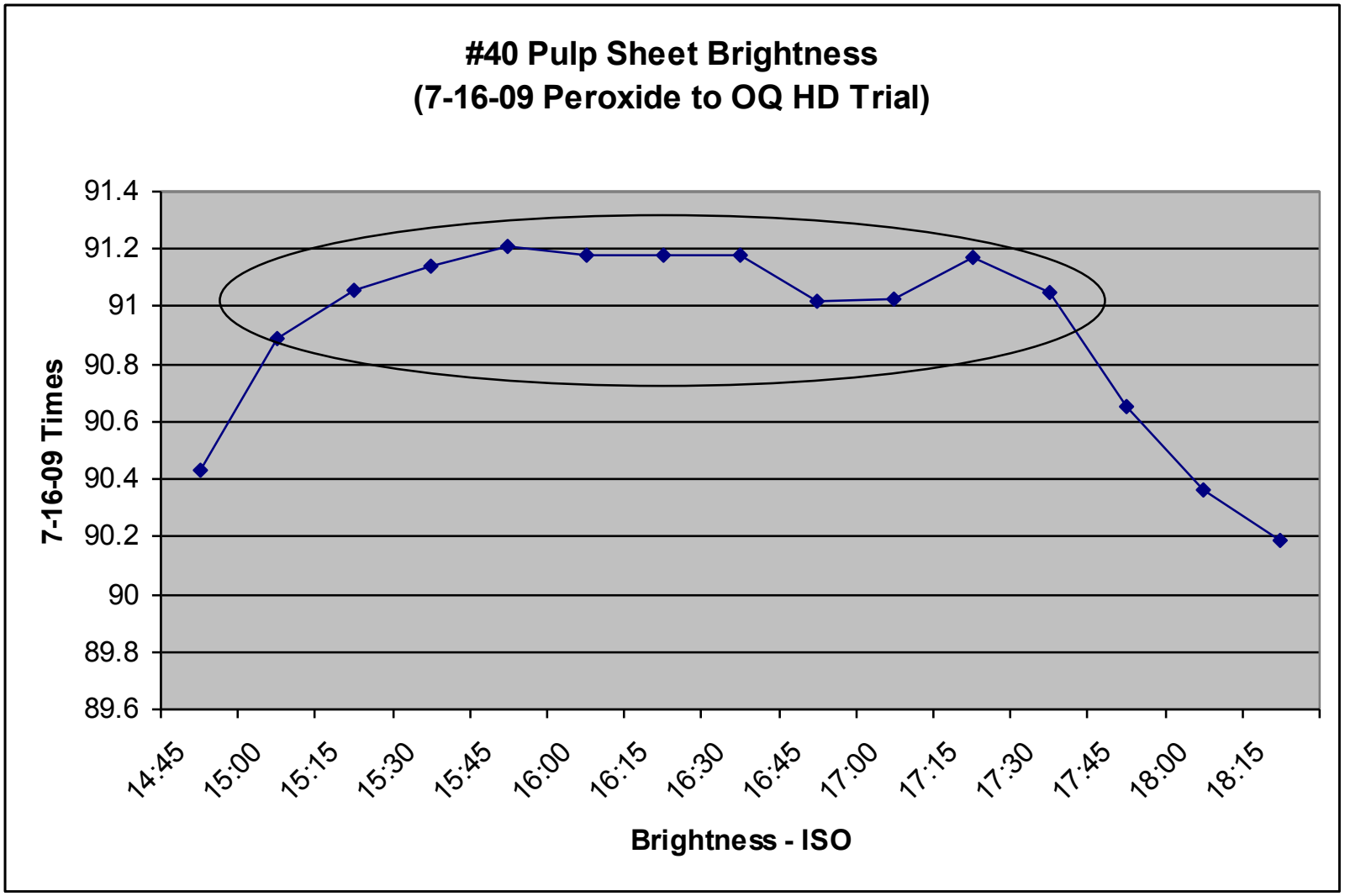


Addition Point for NaOH & H2O2 to D2

Development History of Peroxide to HD

- Internal Company discussions / experience
- Peroxide supplier recommendations
- Trial Plans
- Trials
- Measurement of Peroxide Residual on Pulp Dryer white water

Initial Trial Work

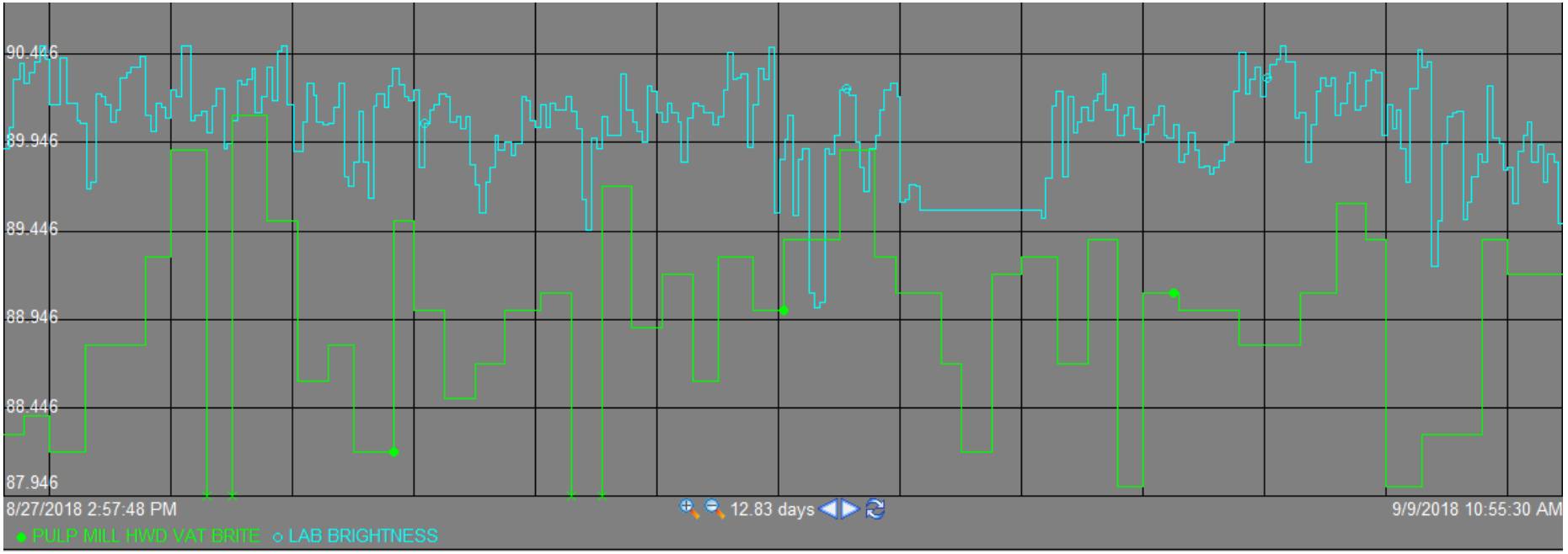


Operating Conditions Optimization

Condition	Target	Comment
pH into HD	10	
Peroxide Charge	0.10	%Applied on OD pulp
Initial Targets		
pH	10.5	Have worked down in a couple steps
Peroxide Charge	0.30	Have worked down in a couple steps

Results of Peroxide Addition

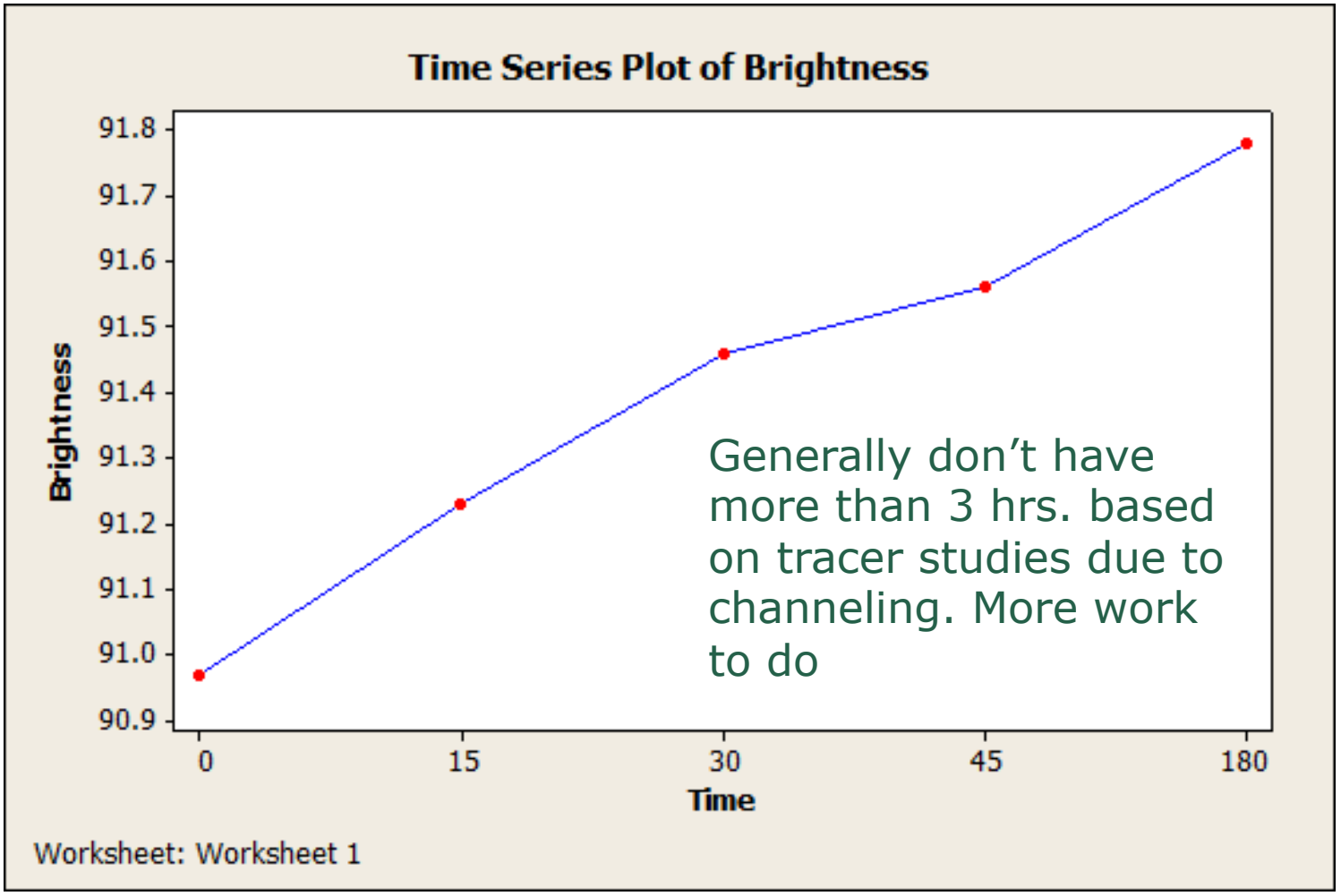
Raising brightness from 89 to 90+



Optimization

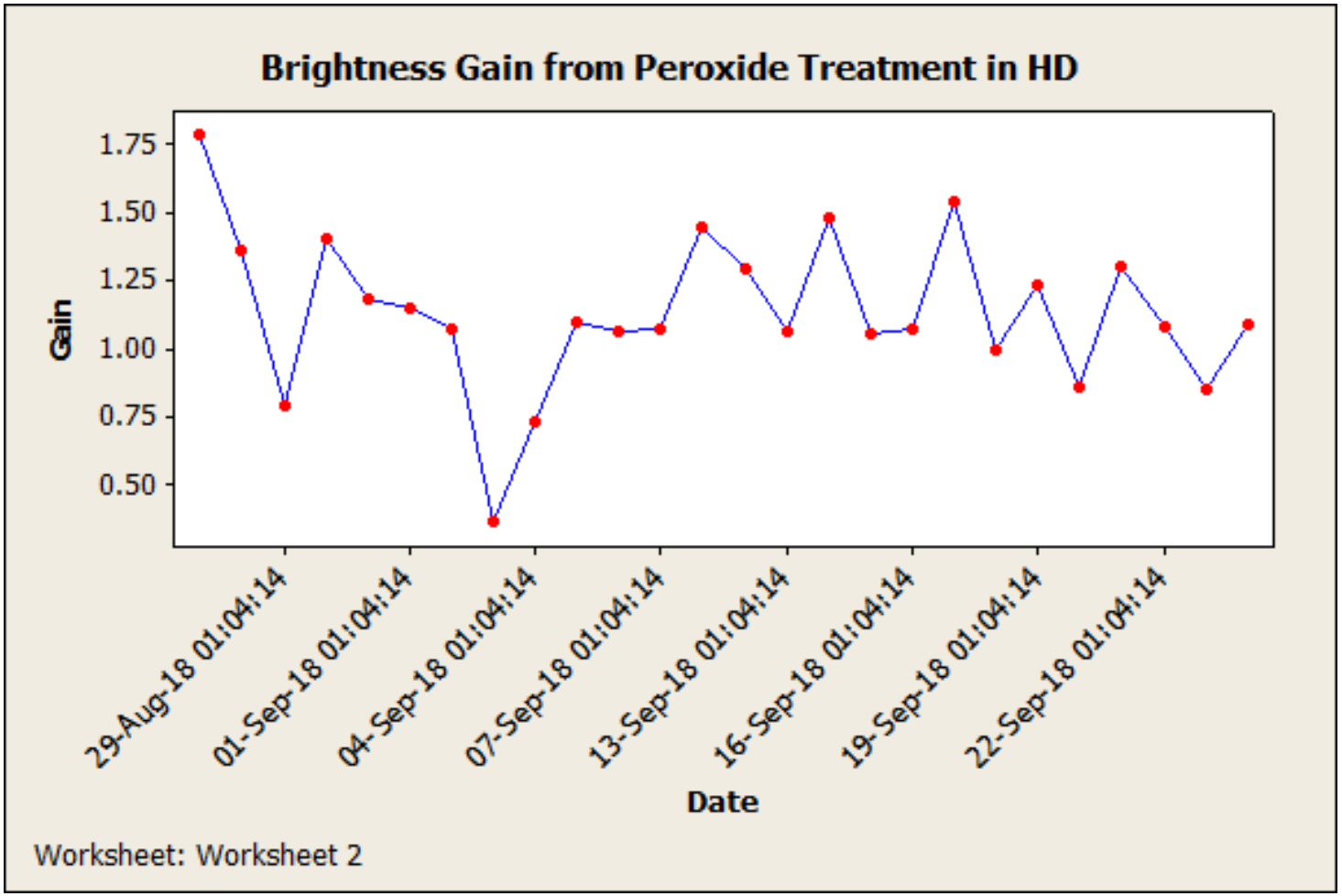
- Mainly focused on attempting to reduce the charges of caustic and peroxide
- Have evaluated the impact of retention time and an option for improving this

Impact of Retention Time on Brightness



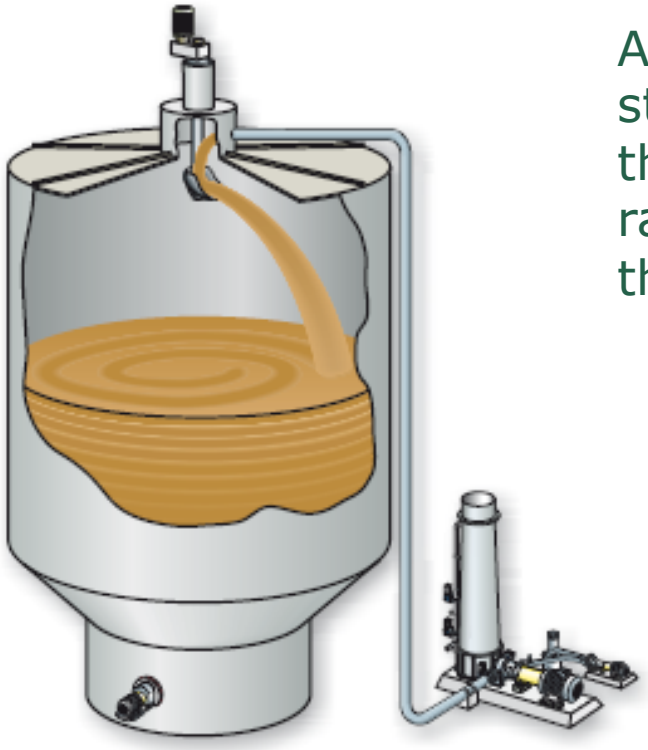
Generally don't have more than 3 hrs. based on tracer studies due to channeling. More work to do

Example of Variability in Brightness Gain



Example of Newer Stock Entry Technology for HD's

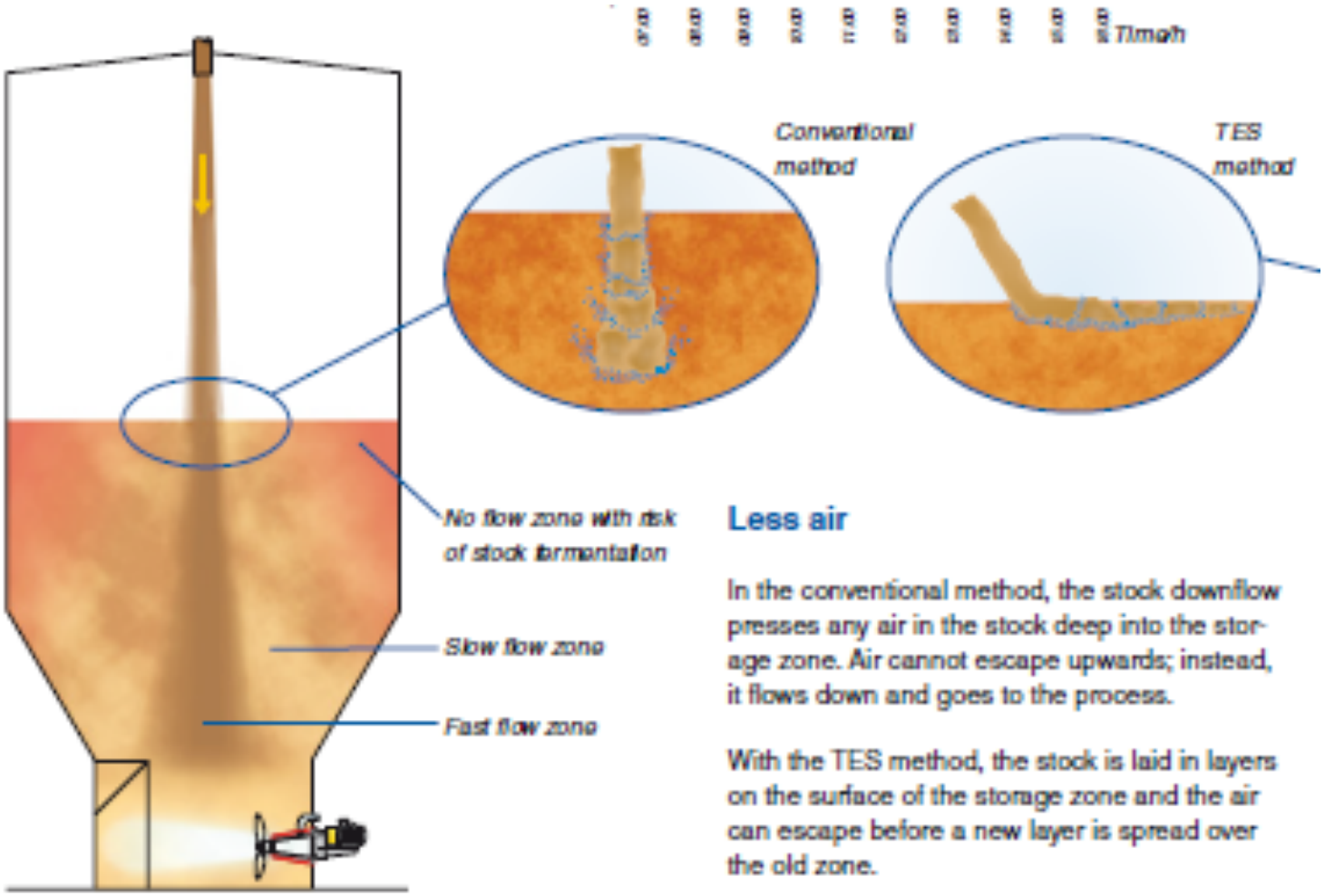
Sulzer Pumps
SALOMIX® Top Entry Spreader



A spinning paddle "Lays" the stock in, spreading it across the full diameter of the HD rather than blasting it down the center

There are presentations on the Committee website from Howe Sound and DMI who have installed these with success

From Sulzer Top Entry Spreader Literature



Less air

In the conventional method, the stock downflow presses any air in the stock deep into the storage zone. Air cannot escape upwards; instead, it flows down and goes to the process.

With the TES method, the stock is laid in layers on the surface of the storage zone and the air can escape before a new layer is spread over the old zone.

Remaining Opportunites to Improvement

- Repeat retention studies with goal of using to help justify some type of pulp spreader for the Pulp Dryer HD
- Continue to push peroxide and pH targets to reduce chemical cost

Wrap-Up

Summary of Learnings

- Peroxide addition **may** boost your final brightness
- Caustic addition is necessary to activate the Peroxide, if you can do it without caustic it is likely due to high ClO2 residual and the Peroxide is neutralizing it.(Mark Cameron presentation)
- Retention time matters
- pH and Peroxide charge need to be determined for your pulp & conditions
- Don’t forget about Peroxide interlocks as well as releif valves to keep from bottling up the Peroxide
- It takes a while to “Condition” an HD since it will have pockets of pulp that are “Dead” and don’t see the Peroxide and Caustic right away.

Things to Consider

- Talk to your Peroxide Supplier, they have expertise
- Design of Peroxide handling including pressure relief and interlocks
- Will likely need caustic to activate the Peroxide
- Retention time available
- pH Measurements to help avoid over-addition of caustic which can cause darkening of the pulp
- Don’t forget the impact of raw material pricing. As prices change so does the benefit

Questions????