

New Findings: E1 Washing & D1 Filtrate

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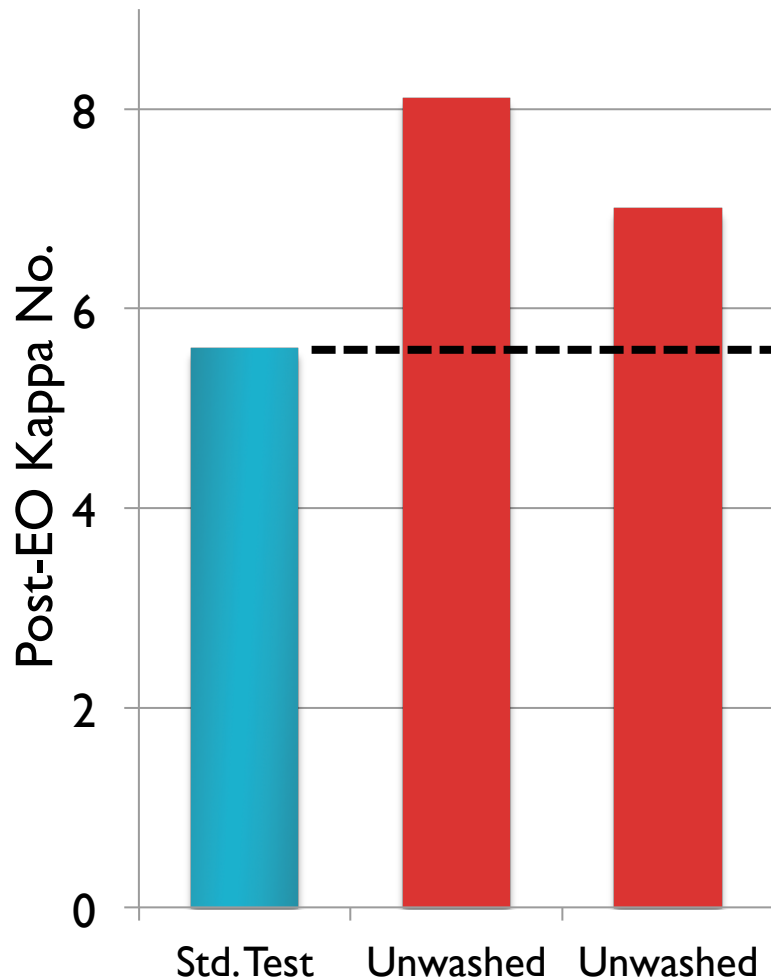
PAPTAC Bleaching Committee
Fall 2014 Meeting

E1 Washer Carryover

It is well-known the E1 washer carryover consumes ClO_2 in the D1 stage



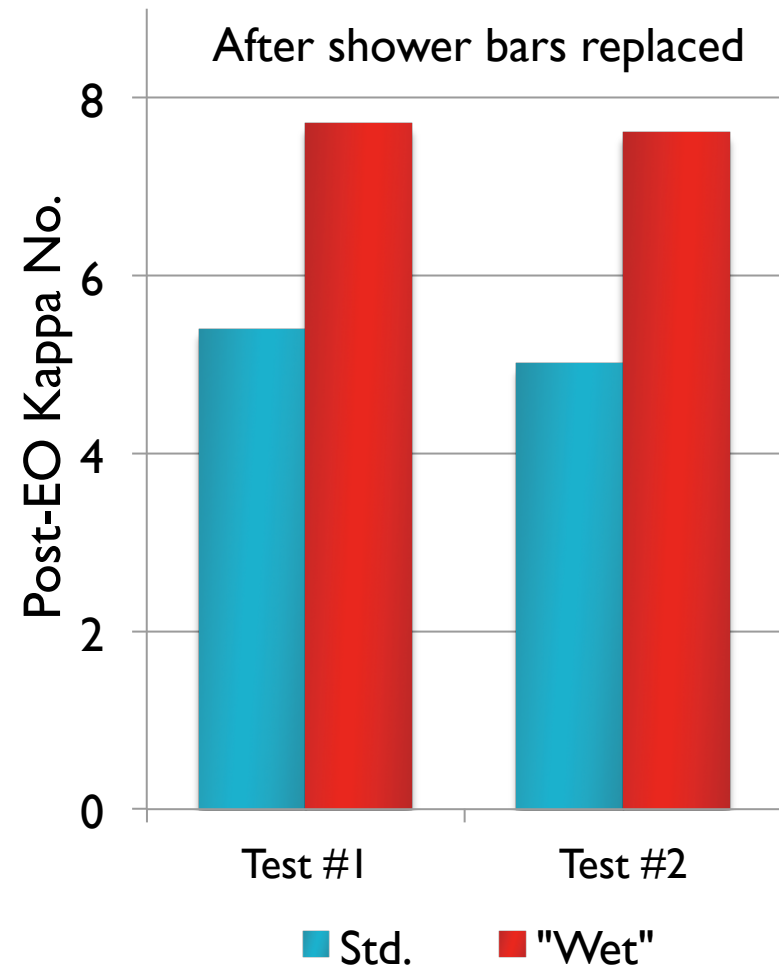
“Wet” Kappa No. Testing



- ▶ “Wet” or “unwashed” kappa no. test includes the filtrate surrounding the pulp sample
 - ▶ Measures contribution of carryover
- ▶ Example on left (Mill A) indicates that on average, 25% of the ClO_2 added to the D1 stage is being consumed by EO carryover

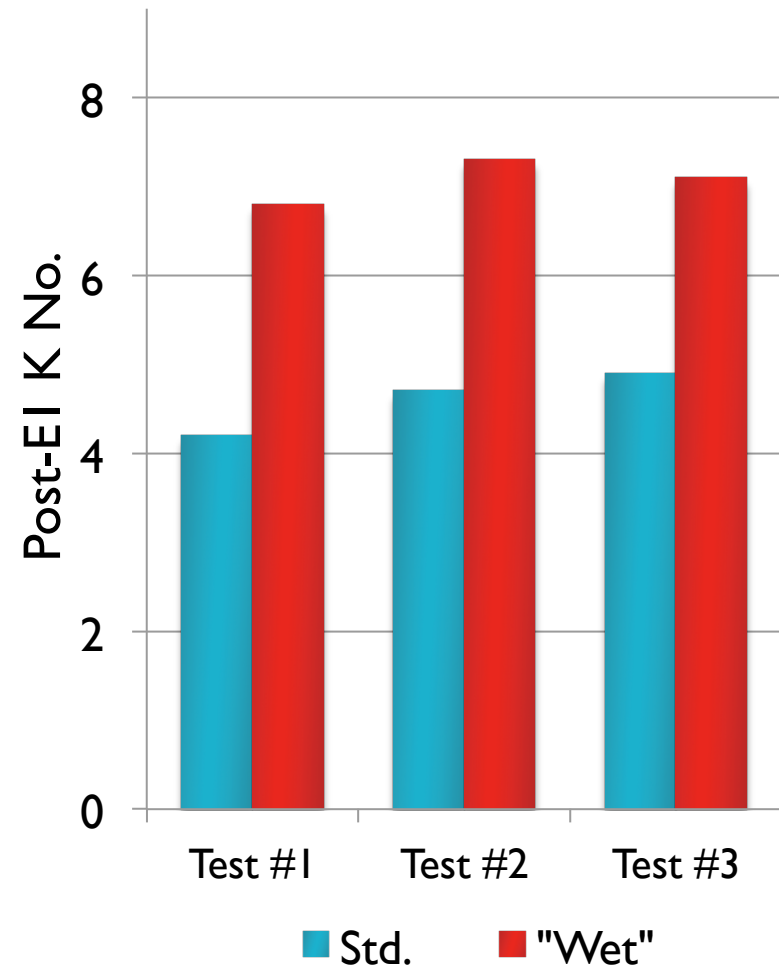
Mill A: Changes to EO Washing

- ▶ Mill replaced EO washer shower bars
 - ▶ Pulp was visually cleaner
 - ▶ Mat pH profile indicated good washing
- ▶ ***But kappa no. testing indicated no improvement!***
- ▶ D1 ClO₂ use had decreased, but mill had also implemented D1 Kappa Factor control at the same time



Mill B: E1 Washer Testing

- ▶ Mill B – E1 pulp visually very clean
- ▶ ***But repeat K# testing indicated significant carryover***



E1 Washing with D1 Filtrate

- ▶ Both Mill A and Mill B operate with a very low D₀-stage Kappa Factor
- ▶ Both mills run to a relatively high E1 kappa no.
- ▶ Both mills use D1-stage filtrate for E1-stage washing
- ▶ Both mills operate the D1 stage at low pH
- ▶ Both mills run to low D1-stage residual
 - ▶ Mill A = 6 ppm ClO₂ average vat residual
 - ▶ Mill B = zero residual
- ▶ Both mills run to low D1 brightness

Testing of D1 Filtrate

Mill A:

- ▶ D1 filtrate Kappa No. = 2.0 to 4.0 (corrected to 1 g pulp)

Mill B:

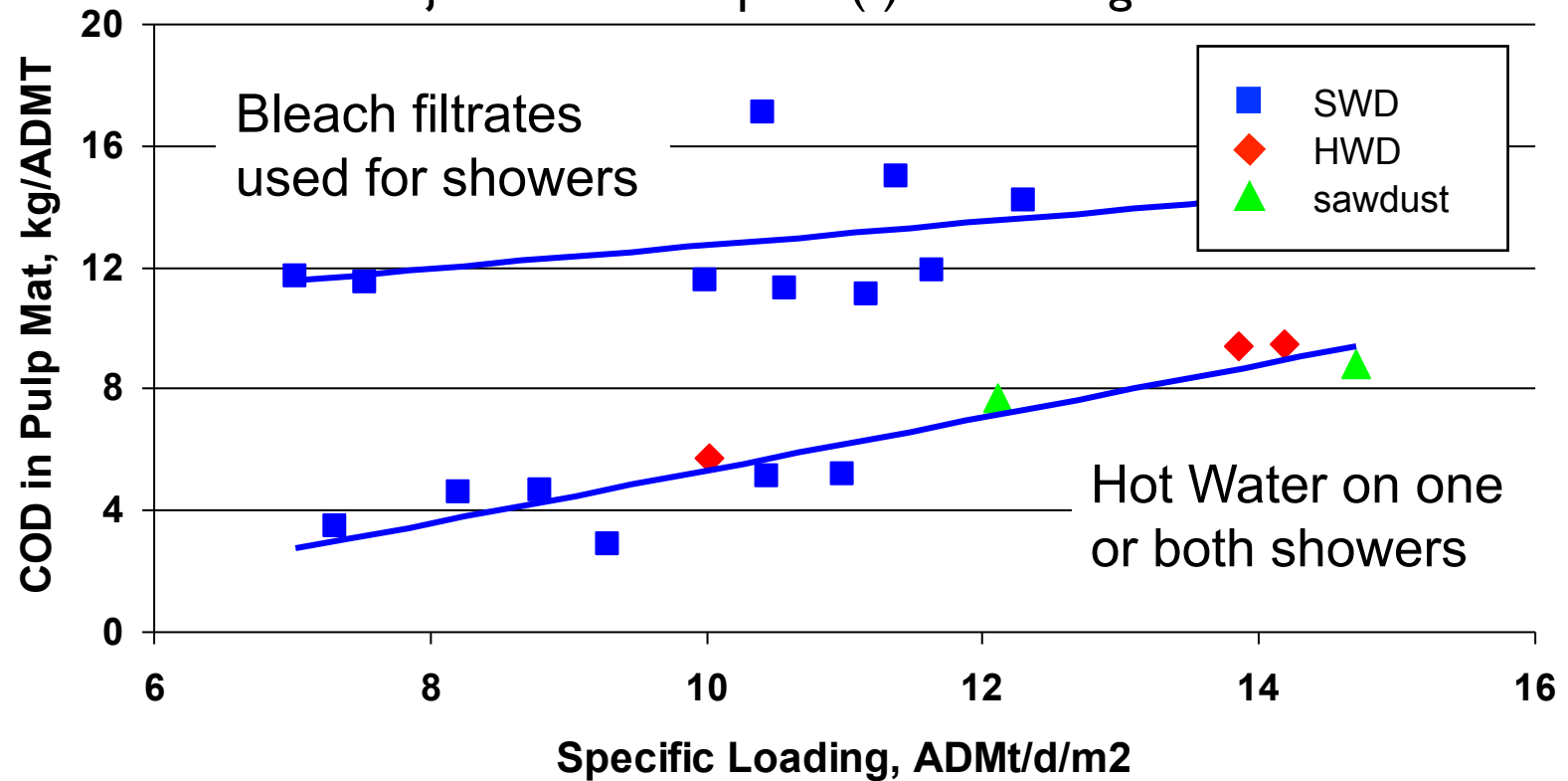
- ▶ D1 Filtrate K# = 2.6 (corrected to 1 g pulp)
- ▶ ClO₂ demand of D1 filtrate = 0.186 g/L

Hypothesis:

- ▶ Both mills run the D₀E₁ stages in such a way that a significant amount of lignin enters the D1 stage, and the D1 stage applies only enough ClO₂ to partially oxidize the remaining lignin.
- ▶ So in some circumstances, D1-stage filtrate can still have a significant ClO₂ demand!

E1 Washing / D1 Filtrate

We saw this before – 2006 Bleaching Committee project – we just did not exploit (?) the full significance!



(Earl & Schofield, 2007)

Proposed Project

- ▶ Have mills measure Kappa No. (and ClO_2 demand?) of D1- & E2-stage filtrates
- ▶ Report test results with bleaching conditions at time of sampling:
 - ▶ Bleach feed kappa no.
 - ▶ D_0 Kappa Factor
 - ▶ E1 kappa no.
 - ▶ E1 shower sources
 - ▶ D1 ClO_2 charge
 - ▶ D1 terminal pH & terminal residual
 - ▶ D1 brightness