

D0 Retention Time and Eop Caustic Usage

Two of our Mills have very low Caustic Usage

• Sent out email question on extended D0 stage (greater than 1.5 hours) and got a response from Norm Liebergott:

- *“Initial phase in D0 is rapid (~80% completed in first 5 mins)*
- *Remaining delignification proceeds slowly over next 45-60 minutes*
- *If pulp has another hour or more to sit in the bleaching liquor, even though the ClO₂ is spent, other ionic species (chlorate (useless), chlorite, chlorous and hypochlorous acids (HClO₂ and HClO) exist*
- *Unbleached softwood kraft pulps contain up to 7% HexA which are not removed in O₂ Delig and as lignin is removed in O₂ Delig, that percentage may go up to 15%v of the total residual value.*
- *The chemical acids affect the solution containing the ions and the extended retention time D0 has a leaching effect, reducing the acidity of the pulp after washing, thereby reducing the charge of caustic in Extraction”*

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- Other Responses:

- *"I have one client mill with an NaOH-to-ClO₂ ratio of 0.75; they also have O₂ delignification, an open pre-bleach washer, low kappa to the bleach plant, and an MC Do stage (although not with 2 hours retention time). Their average Eop washer vat pH averages 9.8 to 10.1. I would suggest wood species as a possible explanation as well - Paul Earl*
- *I would think the 2 hour retention time and the open washers must be the key - James Goldman*
- *One suggestion would be to test the caustic demand on the D0 filtrate as well as the caustic demand of the pulp off of the washer. If the last shower on the D0 washer is hot water due to the three stages you may just have a very clean pulp with a low caustic demand to get to the pH target" - Dale Shewchuck*

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- Other Responses:

- "2 Hypotheses: The first one is if peroxide gets decomposed quickly, peroxide being acid, then caustic takes the floor. The second one is how much alkaline water is returned to D0 showers, if there is alkalinity in those showers. But I think the first hypothesis is more likely"* - Raymond Paquet

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- Other Responses:

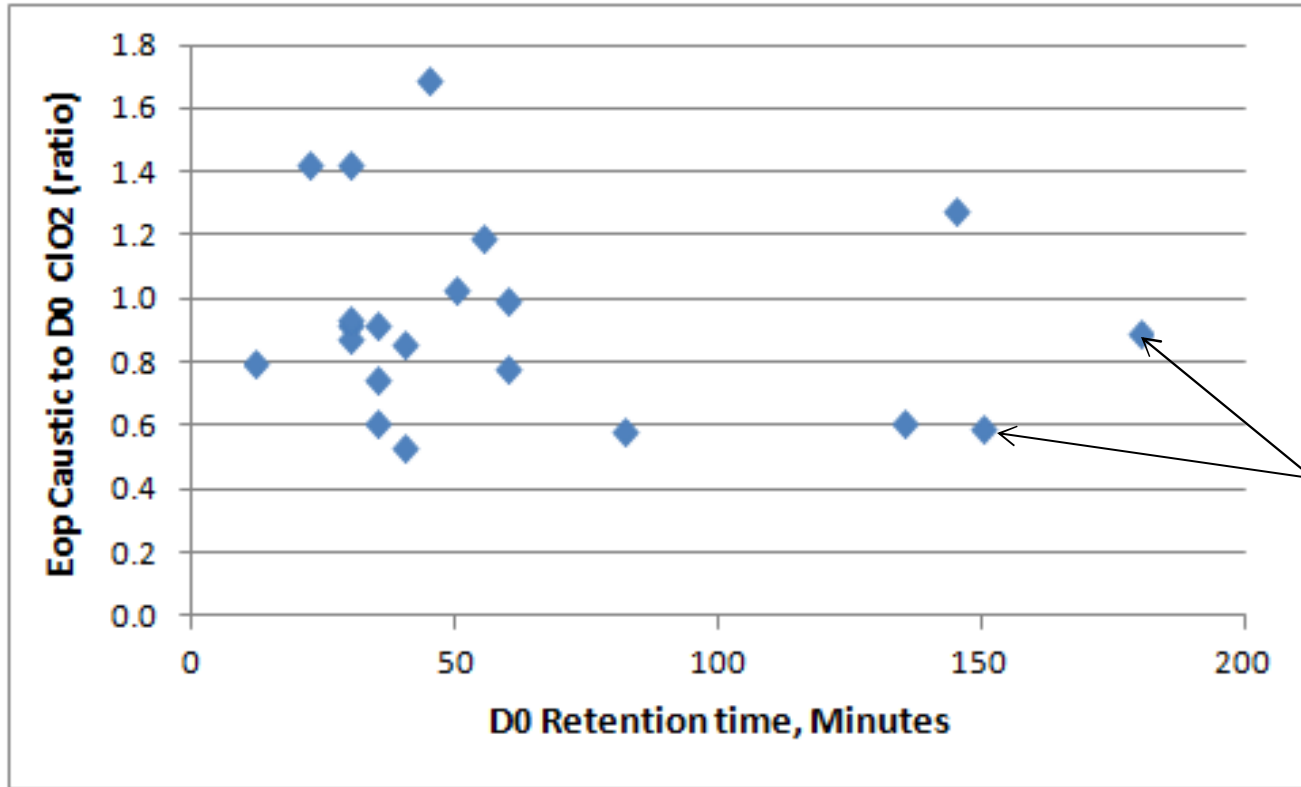
- “The long Do stage definitely has an impact and is probably main cause of good performance. I would also ask the following questions: What DF is being used on the Do washer? What is being used on the Do showers? How are the different mills controlling their caustic addition? It is possible it is used in excess at other mills. Are all the mills same sequence? If so is the low caustic use being made up by higher usage in following stages or lower final bright than the other mills?”* – Gerry Pageau

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- Other Responses:

- “On the Do washer we have 6 shower bars, the bottom 2 bars have D1 filtrate and the top 4 bars have E1 filtrate. By doing this, we have reduced caustic demand at E1 because we are increasing the stock pH as it leaves the Do washer. We also add E1 filtrate to the Do repulper. We have also found that cleaning and calibrating the E1 tower pH probes is key; we do it once per week.” - Andrew Anacker*

SURVEYED MILLS – ALL O2 DELIG SWD



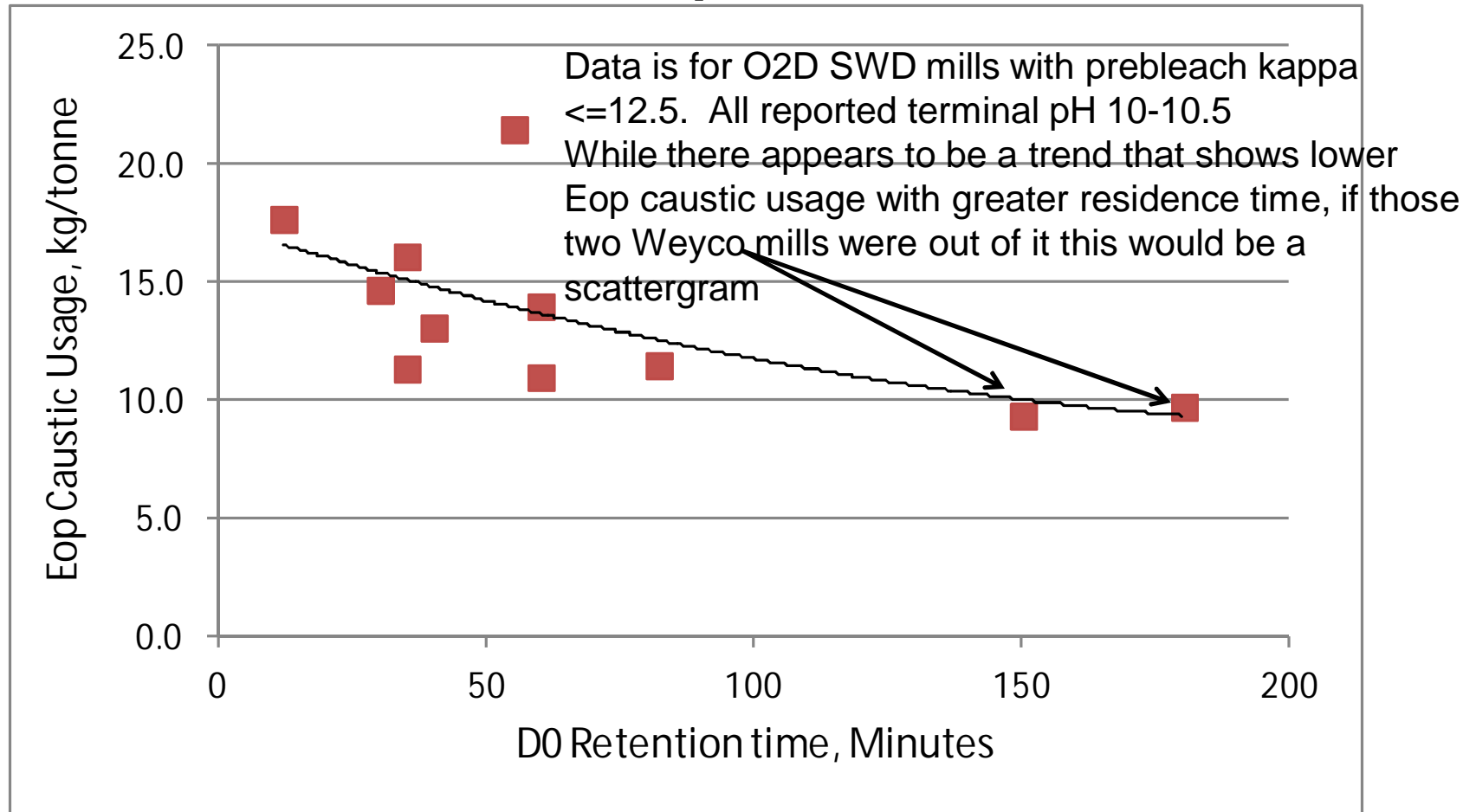
These are our mills. Both have very low caustic usage (~20 lb/ton, or 10 kg/tonne). But realize that in looking at the ratio of caustic:ClO₂, the ratio can be high if the mill has very low D0 dosage, maybe ratio is not what we need to look at.

Thanks to Paul for the Paptac Survey results and I added our mills that did not partake in survey

SURVEYED MILLS – ALL O2 DELIG SWD

- Does not appear that we can conclude anything regarding extended D0 retention time and low Eop ratio to ClO2.

BECAUSE IF PLOTTED WITH ACTUAL Eop USAGE...



SURVEYED MILLS – ALL O2 DELIG SWD

- Still does not appear that we can conclude much regarding why some mills have very low (0.95-1%) caustic charge in Eop and still have terminal pH in the 10's.
- Time to do some bleach studies on pulp using different D0 retention times to see if retention time has any affect on the next stage caustic addition.