~~No. 3 Bleach Plant~~
O & M Plan

Plant Overview

The Georgia-Pacific Palatka Operations mill uses a Prewash-D_0-E_{op}-D_1 bleaching sequence.

In simple terms, the bleaching sequence is

Prewash Stage - provides final washing and consistency control of the pulp before starting the bleaching process.

D_0 Stage - the first bleaching stage, where chlorine dioxide (D_o; ClO_2) followed by washing. This stage solubilizes most of the remaining lignin.

E_{op} Stage – the second bleaching stage, where the sequential addition of caustic (E; NaOH), then hydrogen peroxide (p; H_2O_2) and oxygen (o; O_2) takes place, followed by washing. This stage dissolves the soluble lignin and removes it at the stage's wash press.

D_1 Stage – the final bleaching stage, where the true bleaching of the pulp occurs using chlorine dioxide (D_1; ClO_2), followed by washing. In this stage, the pulp is bleached to the desired brightness and the impact of impurities (wood dirt, shives) is greatly reduced

The main objective of bleaching is to increase the brightness (whiteness) of the pulp while still maintaining good physical strength properties. The pulp is then used by the paper mill to manufacture a wide variety of consumer goods.

When bleaching pulp, there are a number of key parameters that influence the results of the chemical reactions and the effectiveness of each treatment. To obtain optimal bleaching results, specific conditions need to be met in each stage. The chemicals used in the different bleaching stages vary in their selectivity when reacting with cellulose and lignin as well as their ability to brighten the pulp.

The four key parameters for all bleaching stages are:

1) chemical dosage
2) reaction time
3) reaction temperature
4) stock pH

All bleaching chemicals react according to the same principle with a fast initial reaction phase and then a slower subsequent phase. Chlorine dioxide (ClO_2) is unique, however, having an almost instantaneous reaction with pulp.

In order to take advantage of this known reaction mechanism, a typical bleaching stage usually involves chemical addition, a chemical/pulp mixer, reaction in a tower to provide

retention time, followed by washing to remove the excess chemicals and reaction products.

The Palatka facility utilizes this type of equipment for the bleaching of both hardwoods and softwoods in the same and only bleach plant. The physical equipment operation is fundamentally the same for both species with different targeted values for the four key parameters mentioned above.

The following are examples of the type of instrumentation used to assure a safe, effective, and efficient bleaching process:

- Flow Indication for stock, water, effluent, chemicals, and steam.
- Consistency meters prior to each beaching sequence for chemical addition.
- Temperatures for all flows in all stages of the process.
- pH probes for stock and effluent throughout the process.
- Chemical residual analyzers for stock streams throughout process.
- Stock Kappa analyzer at each stage for chemical addition.
- Brightness instrumentation at each stage for brightness development and chemical addition.
- Fiber length analyzers for accurate species tracking and correct chemical addition.
- ClO_2 strength analyzer for maximizing ClO_2 addition on stock.
- Local and DCS gas emission alarms strategically placed throughout all levels of the operation.
- Conductivity probes in sever effluent.

Operator training consisted of the following:

- 24 hours of Computer Based Training
- 16 hours of Class Room Training
- 16 hours of in the Field Training
- 40 hours of one on one Running the Plant Training

The operating staff of this equipment utilizes sophisticated Digital Controls Systems via remote PC to monitor and make every control adjustment to the key parameters. Operators maintain a log sheet that contains critical operating data. A shift by shift equipment checklist is completed each day for equipment lubrication, vibration, noise, and temperature. A multitude of alarm limits and safety interlocks also help to assure that the four key parameters are kept in check.

In an effort to verify that the control instrumentation is correct, operating staff complete manual test verification log sheets periodically during the day. Deviations from field instrumentation are adjusted as needed and calibrations are made as soon as possible. To

minimize the need for frequent adjustments, field instrumentation is inspected, cleaned, replaced and/or calibrated on either a daily, weekly, or monthly basis.

All environmental, safety, or major pieces of equipment have written maintenance procedures and parts lists readily available to the maintenance staff. Preventative Maintenance routes are completed routinely via either vender recommendations or historical performance. All maintenance work on any piece of equipment is tracked electronically for repetitive issue resolution.