

Canfor Pulp moves to online liquor analyzers

For more than a decade, leading pulp mills within North America such as Canfor Pulp Limited Partnership (CPLP), have moved from manual titration-based methodologies to online liquor analyzers to improve mill efficiencies.

CPLP is the largest North American and third largest global producer of market NBSK pulp. It owns and operates mills in Prince George, BC, which are among the lowest cost NBSK pulp producers in the industry, including its Northwood (NWD) operation, a 580,000 t/year dual line Kraft pulp mill.

To meet the continued demands of increasing cost efficiency and high product quality, NWD was an early adopter of first generation Fourier Transform-Near Infrared (FT-NIR) technology for process automation and control. Originally developed by FPInnovations (formerly Pulp and Paper Research Institute of Canada), FT-NIR technology uses infrared light and spectroscopic analysis to determine the properties of various chemical compounds in a liquor sample. Connected to the mill's distributed control system (DCS), results of the analysis are automatically used in control programs.

The initial FT-NIR technology automated the measurement process of multiple liquor properties. This overcame many of the challenges associated with manual titration methods and provided continuous control of the white liquor to the digester, white liquor sulphidity, and R8 generator liquor chlorate and acid concentrations. Positive outcomes from the implementation included improved accuracy, considerable time efficiencies and chemical and energy cost savings.

While significant benefits were achieved, the original FT-NIR installation had shortcomings that restricted the potential gains of implementation. Identified issues included a sampling cell design that led to occasional optimization difficulties and erratic results, and inflexible supporting software.

In 2009, NWD completed the upgrade to the latest FITNIR analyzer. The configuration of the new analyzer measures 12 sampling streams from two continuous digesters, the ClO₂ generator and the bleach plant. NWD measures a number of key components including active alkali (AA), effective alkali (EA), sulphidity, sodium carbonate, sodium sulphide, sodium chlorate and acid strength.



Figure 1: Operator's Graphic of the Canfor Northwood FITNIR/DCS System

The latest version of the FITNIR analyzer corrected the issues NWD originally encountered and also made a number of key improvements to the hardware including:

- The fiber optic connection no longer requires optimization when the windows are cleaned or replaced.
- Improved window construction eliminated cell window damage.
- Trouble-free maintenance and

sampling, and calibration only upon implementation, met NWD's reliability requirements.

The upgraded software program for the FITNIR analyzer was also much more reliable and maintainable and incorporates:

- A new graphical user interface (GUI) that simplifies troubleshooting.
- ABB's robust, proprietary software adapted to control the FITNIR analyzer to ensure reliability and continued support.
- Multiple formats in which it can operate and standard protocols to communicate with the DCS.
- Programmable diagnostic features that enable alarm configuration and ad-hoc optimization of parameters.

RESULTS

In addition to the efficiencies and savings gained from the initial FT-NIR implementation, NWD has experienced further benefits with the upgraded system:

- Nearly 100% uptime of the FITNIR analyzer.
- Improved data accuracy and consistency.
- More reliable black liquor measurements have reduced the kappa number variability, leading to more consistent product quality.
- Increased up-time of R8 generator supervisory controls has reduced chlorate and acid concentration variability.

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