



## SUMMARY

### Clearwater Paper

### Industry

Pulp and Paper, Paperboard

### Business Value

- Business Intelligence
- Operational Insight
- Performance Optimization
- Process Controls

### PI System™ Components

- PI Server™
  - Data Archive
  - Asset Framework
- Developer Technologies
  - AF SDK
- PI DataLink™
- PI ProcessBook™
- PI Vision™

## Making the Grade: Gaining Insights from Thousands of PI System Tags

Clearwater Paper is the largest provider of private label tissue to retail grocery chains in the United States and a manufacturer of bleached paperboard. With seven manufacturing sites, over 10 paper machines, over 50 tissue converting lines, and pulp mills, recovery, and power boilers, real-time operational intelligence is critical to the company's success. A PI System user for over 20 years, Clearwater Paper relies heavily on system insights, but it was a challenge to manually create targets and KPIs for every PI Tag. With the help of Envoy Development, they were able to put the right metrics in place to understand deviations and take appropriate action to keep production on track.

### Aggregating Data to Monitor Thousands of PI Tags

With tens of thousands of PI Tags and limited internal resources, the majority of Clearwater's tags were not monitored. "The vast majority of those tags are just collecting and it's difficult to put targets and limits on all those tags," said Troy Foede, West Region Black Belt at Clearwater Paper, during the 2017 OSIsoft Users Conference in San Francisco. These control limits are imperative to understanding asset performance because they quickly help identify deviations in order to prevent quality issues or catastrophic equipment failure. For Clearwater, applying limits is further compounded by the fact that the paper machines run dozens of different grades – often in the same day – and the speed of each process can affect targets and limits.

Clearwater then implemented the Envoy Process Monitor (EPM) to aggregate data and determine, in real-time, which tags were outside of statistical limits. Now, each mill is broken down into separate processes and all tags with numerical values are collected and indexed using EPM. EPM identifies what drives KPIs and tags that have fluctuated beyond normal range as well as the timing and relationship between those tags. Clearwater can use this insight to create tag targets and limits which are fed into AF SDK and automatically change as grades change. Now, Clearwater understands differences in performance, no matter how subtle, and can take appropriate action on much smaller subsets of tags.

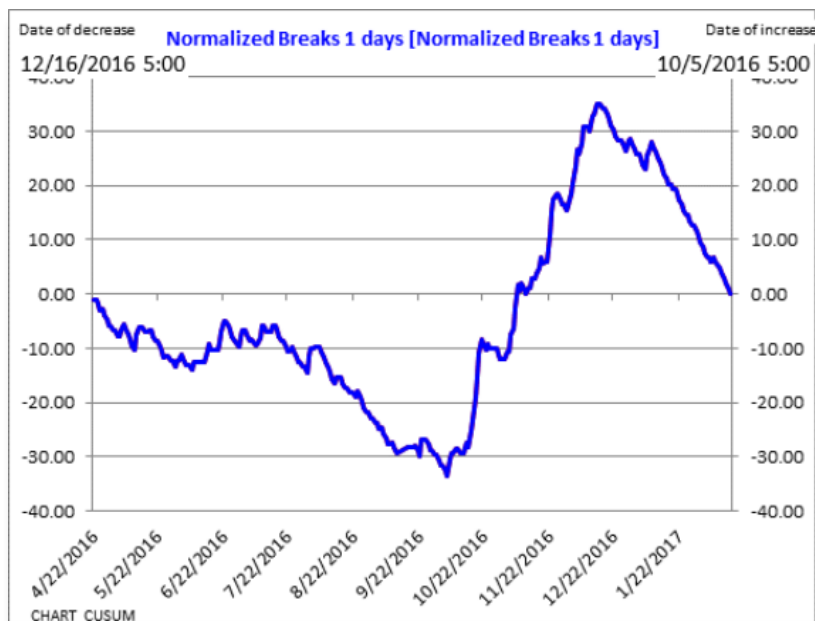
### Hot Off the Paper Mill

Clearwater noticed that the average daily motor temperature on one of the paper mills had slowly increased over time. The changes weren't flagged as critical because temperatures can vary depending day and night, but averages were outside of normal limits, indicating a potential malfunction or jam. Upon inspection, they found debris in the motor which they removed and the temperature returned to normal. Based on

this experience, Clearwater then set tag limits that would generate alerts if the motor temperature moved outside of the normal range again.

### Keeping the Mill Rolling with Inflection Points

In statistics, a CUSUM charts show averages and inflection points with the inflection points indicating change. Charts showed that that production interruptions, or breaks, in the mill had changed on October 5 and then changed again on December 6. To determine the reason for the breaks, they looked at the tag data in the Envoy Excel Add-in. All 3,000 tags were sorted by percent deviations to identify which tags were outside normal range during that period. Of 3,000, 1,025 had deviations.



**Deviation in Data:** After noticing inflection points on October 5 and on December 16, Clearwater quickly identified two tags that showed the root cause of the breaks.

They had to quickly pinpoint which tag – out of 1,025 tags – was the culprit. The tags were filtered by CUSUM inflection points, which reduced the result to five possible culprits. They whittled that down to two tags and those tags indicated that a manual setting change was causing the interruptions. By working with the mill operator to ensure that the setting stayed consistent, Clearwater was able to easily prevent future production breaks.

### Bringing Everything Together with PI System Tools

When Envoy EPM is linked to PI System solutions, it produces far-reaching benefits. Targets and limits are retrieved using PI DataLink and trends can be displayed in PI Vision<sup>1</sup>. With PI ProcessBook SQC charts, alarm conditions for each grade are displayed based on tag limits and the imported targets and limits are grouped by assets in AF. With this influx of information, Clearwater can identify even slight changes in data and make the right adjustments to keep the paper mills running smoothly.

<sup>1</sup> PI Coresight was renamed to PI Vision in 2017.

Foede, Troy and John Antanies. *Less Wires, Real-time Operational Intelligence with the PI System and Envoy Development Process Monitor*. OSISOFT.COM. 22 Mar. 2017. Web. 25 April 2017. <<http://www.osisoft.com/Presentations/Real-Time-Operational-Intelligence-with-the-PI-System-and-Envoy-Development-Process-Monitor/>>.

**“Within a short time, we’ve taken 3,000 tags and gotten it down to the critical two or three. This is really powerful stuff to troubleshoot with. Next, we want to start bringing those targets and limits into other formats so we can use it in different ways – and this is where we really start to leverage PI Asset Framework.”**

– Troy Foede  
West Region Black Belt at  
Clearwater Paper