StoraEnso

Paper, packaging & forest products

Refiner Plate Control Using Variable Frequency Drive

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Refining

- Refining is a defibering process that helps to bond paper fibers together
- The refining process requires stock to pass through a narrow gap of rotating plates
- The refiner motor rotates one disk of plates while a stationary disk of plates is moved to adjust the gap with a small motor

Agenda

- Standard Refiner Plate Control
- Drawbacks
- Plate Control Using a Variable Frequency Drive
- Implementation Learning
- Results

Standard Refiner Plate Control

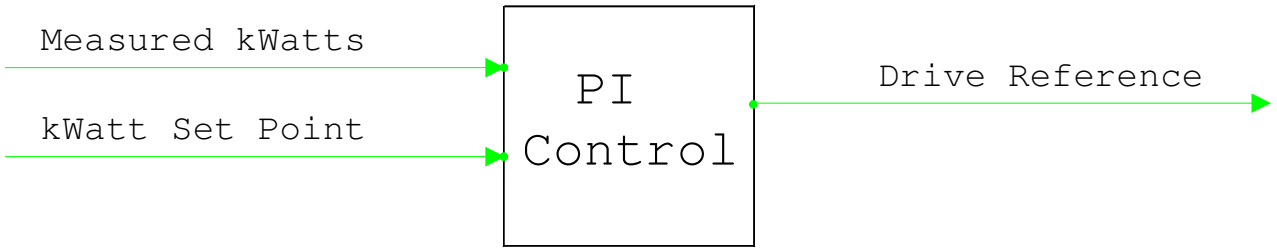
- 2 Speed Motor
- Timed Pulse Duration

- **Drawbacks**
  - Requires a special motor
  - The control scheme is difficult
  - The resulting control is poor

Plate Control Using Variable Frequency Drive

- Off the shelf drive
  - Mill decision
- Plate motor speed range
  - 60Hz inward to -60Hz outward
- Standard PID loop in DCS
  - Output scaled -100% to 100%
    - 0% equals no movement

DCS Control Scheme



Simple

Implementation Learning

- Start up and non-linear response
- Delta – 3 phase with no ground
- Static friction and low end drive torque

Results - Comparing Performance

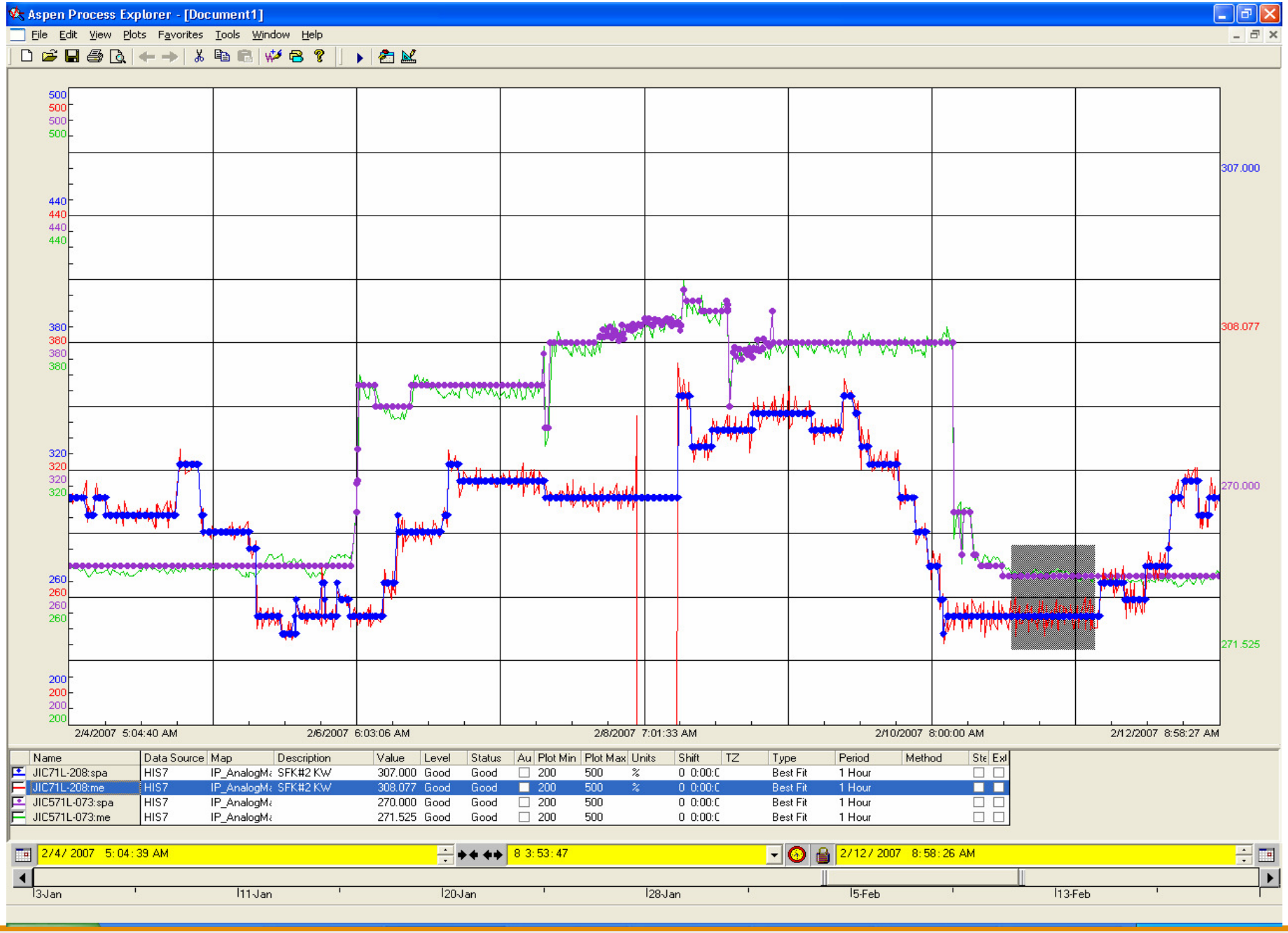
95 Paper Machine Refiners –

Variable frequency drive control

Versus

97 Paper Machine Refiners –

Standard 2 speed motor control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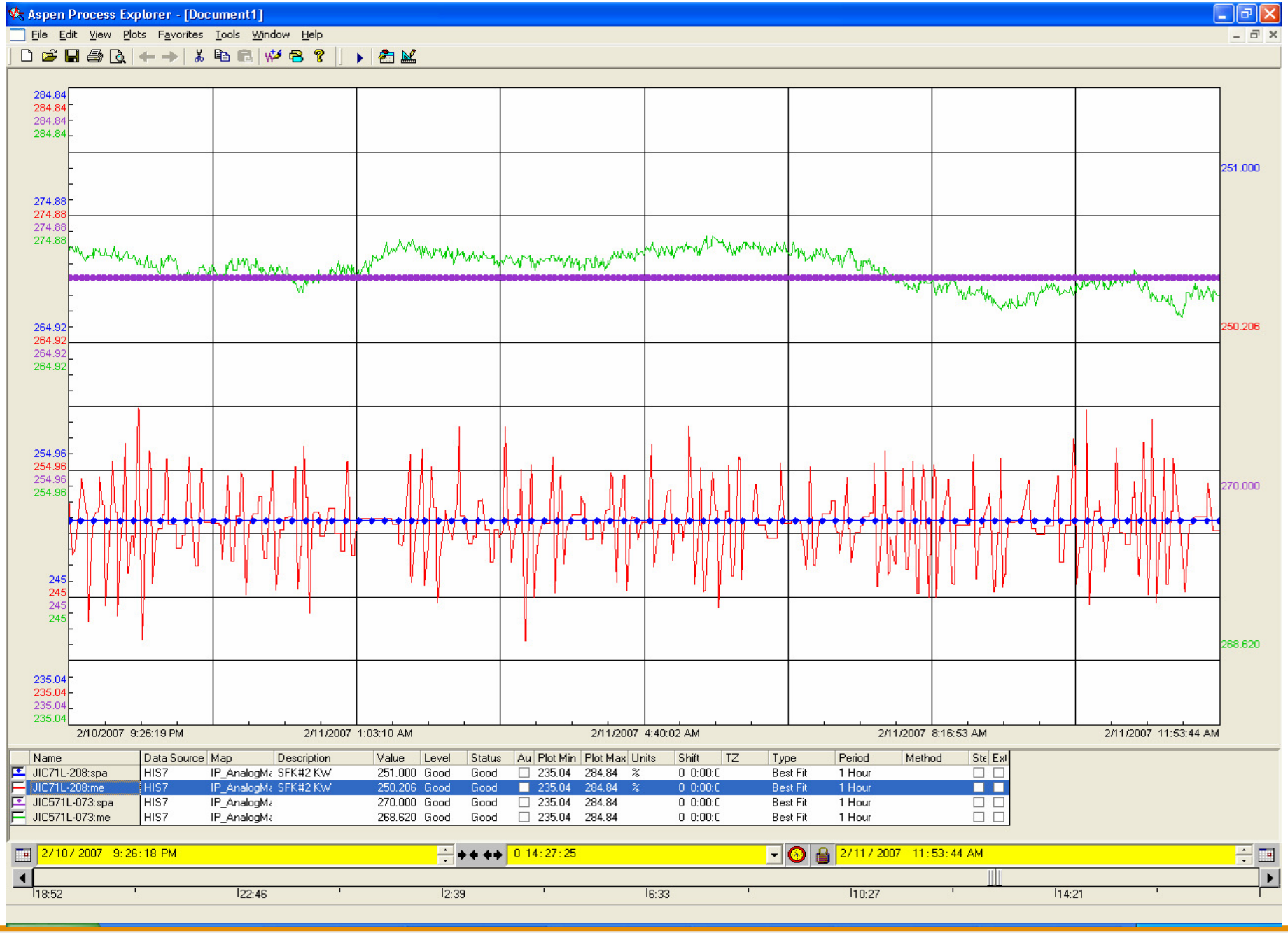
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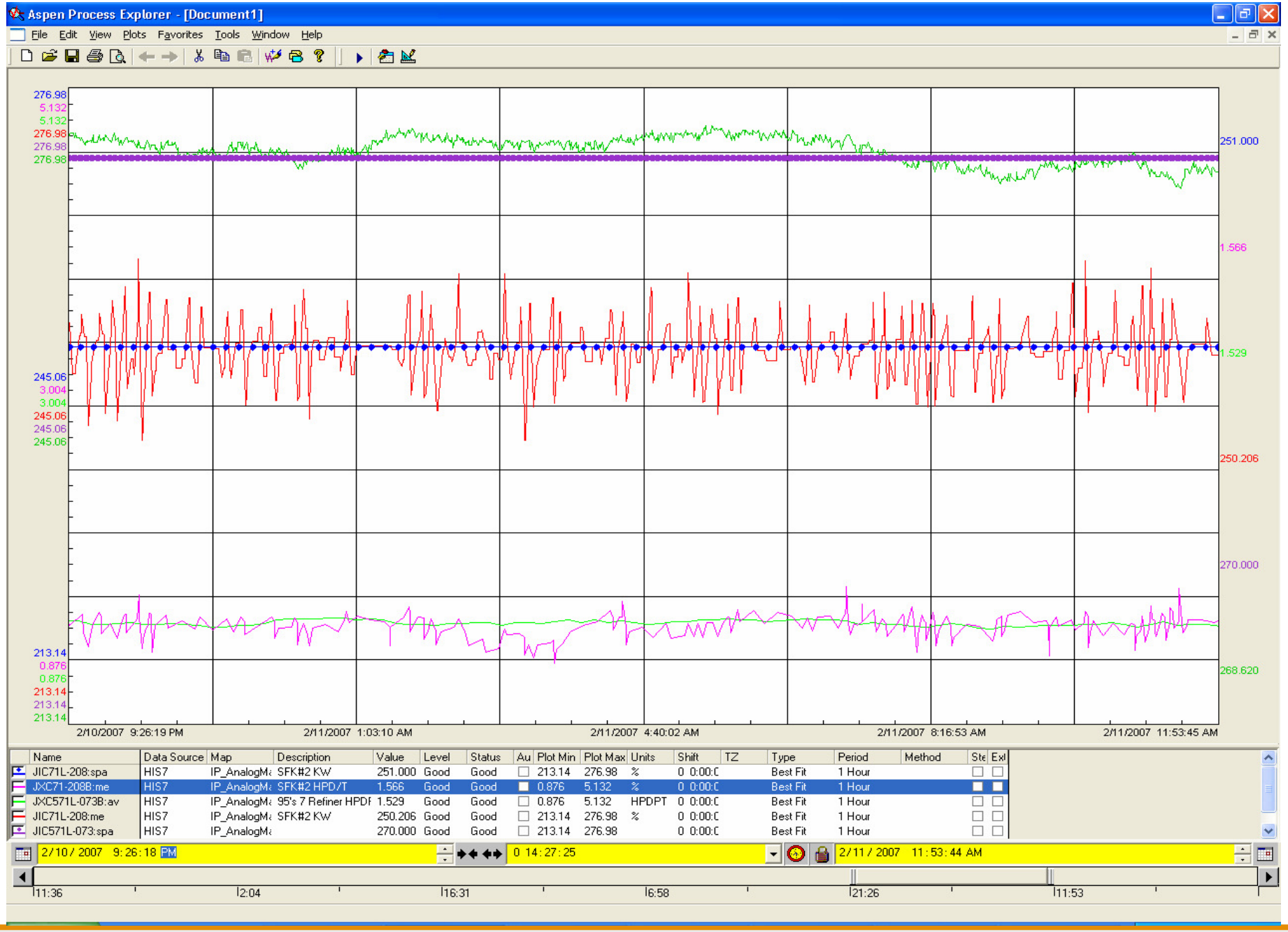
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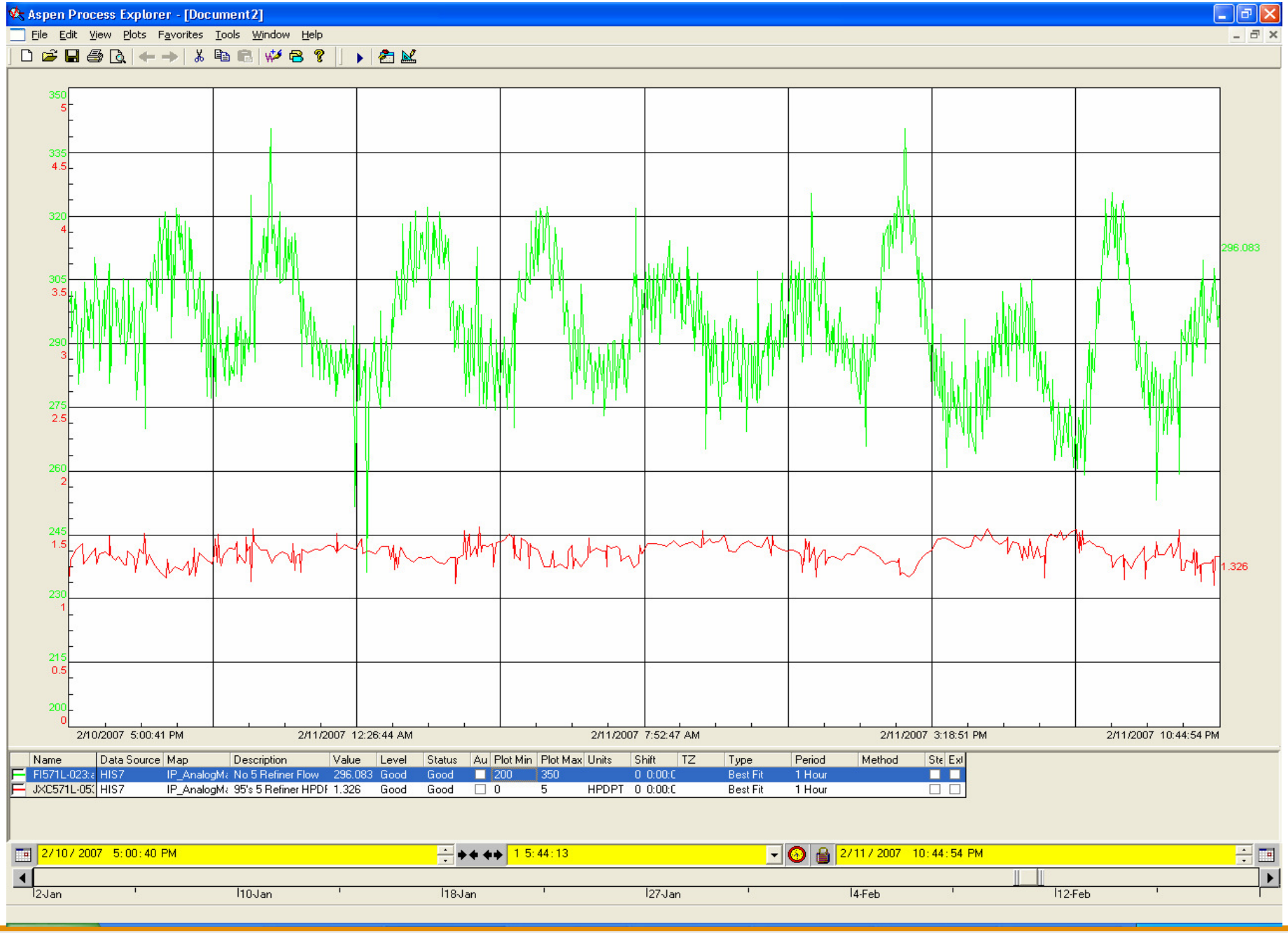
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2-Jan
10-Jan
18-Jan
27-Jan
4-Feb
12-Feb

Summary

- Refining – very important but often neglected
- Using the Variable Frequency Drive simplifies the control system
- Fiber treatment much more consistent through a dramatic improvement in kilowatt control