AVEVA™ PI System™ as a Process Degradation Early Warning System

Richard Smith
International Paper

Who We Are

- Founded in 1898
- 39,000 employees worldwide
- 250 facilities (35 U.S. states & 10 countries)
- 21,000 customers in 150 countries
- $21.2 billion net sales in 2022

Core Values

Recognition

Source: International Paper – Corporate Communications
Our Businesses

Industrial Packaging
82% Total Revenue

Global Cellulose Fibers
15% Total Revenue

Source: International Paper – Corporate Communications
Pulp & Paper – Continuous Industrial Manufacturing

Typical Pulp Mill

• 4 main unit operations
• ~30,000 total equipment assets
  • ~5% designated critical
  • ~1% high priority critical assets
• ~1,500 control loops
• ~30,000 to 100,000 process data tags

International Paper – by the numbers

• Facilities: 29
• PI System Servers: 46
• PI System Tags: 1.5 Million
• Equipment: 120,000 Rotating Equipment

Source: International Paper – Corporate Communications
The Challenge

➢ Process Audits Occur Every 3-4 Years...
➢ Subject Matter Experts Identify Improvement Opportunities...
➢ Improvements Implemented, But Performance Erodes Occurs Over Time...
➢ **Identify and Fix Degradation** Before the Condition Becomes the “New Normal”
Process Health Dashboards (PhD) Check Engine System

Prevent performance erosion (backsliding) over time using continuous online monitoring of a process or set of processes

Actionable

Financially Significant

Unnoticed
Process Health Dashboards (PhD) Check Engine System

Local PI Database (Site 1) → Site 1 ➔ AF ➔ Local PI Database (Site 1) → Site 2 ➔ SQL ➔ Data Warehouse (enterprise data) ➔ Site x ➔ (Analytic tools) ➔ Excel

Local PI Database (Site 1) ➔ Facility PI ➔ Central PI ➔ PI/4BA ➔ Central SQL ➔ Reports ➔ Alerts

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Asset Framework: Unit Operation Templates

**Process**
- Bleach Plant
- Caustic Plant
- Crude Tall Oil Plant
- Digesters-Batch
- Digesters-Continuous
- Evaporators
- O2 Delignification
- Paper Machines
- Pulp Washing
- Recovery Boilers
- Turbines (Condensing)

**Functional**
- Adv. Control Uptime
- Data Conditioning
- Target Compliance
Asset Framework: Consider the Following

- **Plan for Missing Inputs**
  - Default Values (Template)
  - PI Tags
  - Formulas / Table Lookups
  - Synthesized Values (“Specials”)
- **Plan for AVEVA PI Vision and PII4BA**
  - Multistate Values/Limits (PI Vision)
  - Latch Values (PII4BA)
- Many Data Science **Tools are Tag Centric**
Asset Framework: Drop-In Functional Templates

- **Data Conditioning (6000+)**
  - Reduce Data Frequency from Seconds to Minutes/Hour
  - Average/Maximum/Minimum/Interpolated
  - Periodic or Event Triggers
  - Base, Percent to Value, Value to Percent, UOM Convert
  - PI Tag Creation

- **Target Compliance (750+)**
  - Day / Week / Month
  - Statistic from Data Conditioning
  - Compliance Percentage to Target Range
Asset Framework: Drop-In Technology

Before

After

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## Asset Framework: Keeping Track of Backfills

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AVEVA PI Vision: Keeping Track of Backfills
AVEVA PI Vision: Use Collections for Repeating Assets
AVEVA PI Vision: Show/Hide Symbols with Multistate
AVEVA PI Vision: Live Data Superimposed Over Graphic
PII4BA: PHD Materialized View

- Metadata and Measured/Calculated Values
- Time Periods: 15 minute / 1 Hour / 1 Day
- Statistics: Average / Maximum / Minimum / Interpolated
- Continuous Data: Time-Based Statistic
- Lab/Analyzer/Batch Data: Event-Based Statistic
  - Want NULLs if No Value in Time Window
Victory is Within Sight

PHD: Process Health Diagnostic Dashboard

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International Paper Fixes Process Performance Degradation Before It Becomes Systemic

Challenge

• Process Audits Occur Every 3-4 Years...
• Subject Matter Experts Identify Improvement Opportunities...
• Improvements Implemented, But Performance Erodes Occurs Over Time...
• Identify and Fix Degradation Before the Condition Becomes the “New Normal”

Solution

• Leveraging Asset Framework, AVEVA PI Vision and the AVEVA PI System Integrator for Business Intelligence Alerts Subject Matter Experts When Degradation Occurs and Provides Information for Detailed Analysis.

Results

• Process Audits Available Every Day for Key Indicators
• 1st Level Drill-Down Information Available
• System Triggering Significant Alerts each Month
• Work Flow System Tracks Status and Savings
Rick Smith

Manufacturing Process Information Manager

- International Paper
- Richard.SmithJr@ipaper.com
Questions?
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State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

Thank you!
“Quotes really standout on backgrounds like this. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy tincidunt ut laoreet dolore magna aliquam volutpat.”

Quote Credit
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Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life’s essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world’s most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com

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