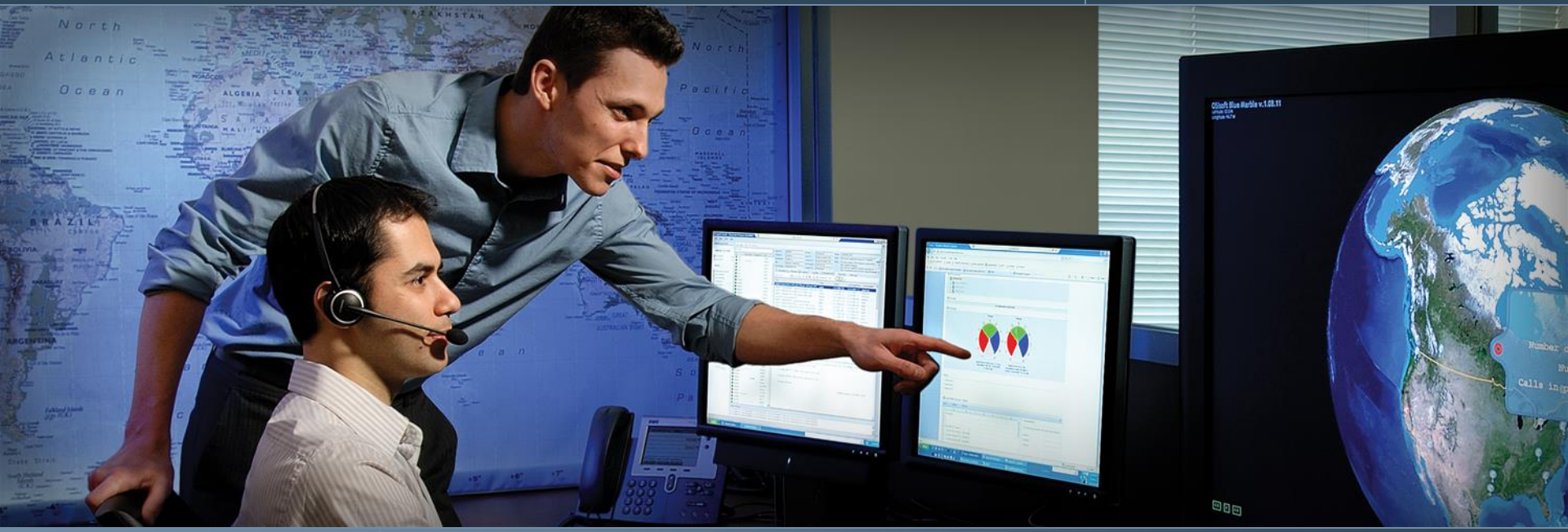
Regional Seminar Series
Atlanta



Reducing Manufacturing Costs by Using "Visual Controls"

Glen Hill
Continuous Improvement Manager
SP Newsprint Co., LLC

October 22, 2009

Empowering Business in Real Time.

SP Newsprint

- SP Newsprint Co. (SP) was founded in 1977 as a general partnership among affiliates of Cox Enterprises, Inc., Media General, Inc. and Knight Ridder.
- SP was purchased and became an affiliate of White Birch Paper in 2008.
- The company operates newsprint mills in Dublin, Georgia, and Newberg, Oregon as well as SP Recycling Corp, a wholly owned fiber procurement subsidiary with facilities primarily in the Southeast and Western portions of the United States.
- Annual newsprint production totals approximately one million tons

SP Newsprint – Dublin Mill

- SP Dublin began operation in 1979 with No. 1 paper machine and expanded in 1989 with a second machine.
- The Dublin Mill produces 100% recycled newsprint. Raw material is old newspapers gathered from the entire southeast, Philadelphia, Chicago, St. Louis and east Texas.
- Four of the last seven years Dublin's No. 2 machine has been the most productive per inch of width in the world.
- Dublin's annual production is roughly 600,000 MT

Newsprint Industry - Challenges

- North American newsprint mill operating rates were at 65% in August, 2009, 73% average for all 2009
- 2008 operating rates were 97%
- Long term trend, before the economic downturn was 10%+ market shrinkage annually.

Newsprint Industry - Challenges

- Remaining competitive in a declining commodity market requires aggressive cost control
- Newsprint will not be going away, but many mills will shut their gates

ONLY LOW COST MILLS WILL SURVIVE

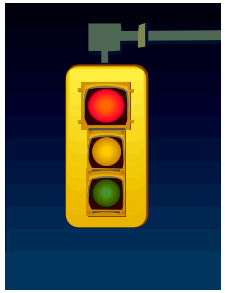
Lean Manufacturing – Key to Survival

- *Lean Manufacturing is a systematic approach for delivering the highest quality, lowest cost products and services with the shortest lead times through relentless* ***elimination of waste.***

Key “Lean” Tool - Visual Controls

Any device or symbol that effectively places information at the point of use with few words or none at all and triggers an action.



What do these buttons do?

Visual Control Questions:

1. What do I need to know?

2. What do I need to share?

HOW CAN WE USE PI TO USE VISUAL CONTROL TO REDUCE WASTE?

PI Application to Visual Control

- Objectives
  - Give Operators and Managers a tool with key performance indicators
  - Give visual triggers to focus only on exceptions which will require actions
  - Tie to troubleshooting tools
  - Provide information not available or practical for DCS
  - Operator Configurable
  - Standard across mill

Mill Dashboard | Troubleshooting Trends

POWER & UTILITIES DASHBOARD

Outside Temp: 78 DEG_F

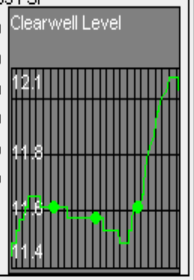
Steam

	1275	350	#1 175	#1 80	#2 175	#2 80
Pressure:	1269	345	172	77	172	78
Temp:	937	636		329	399	398

PM1 Steam Trend | PM2 Steam Trend

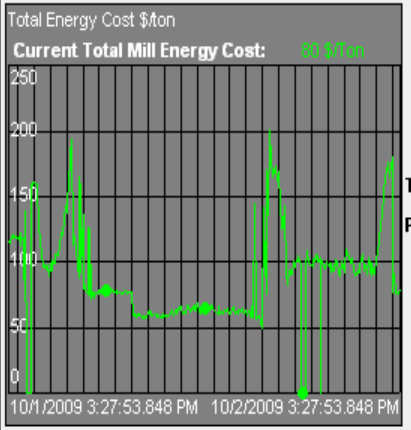
Water

Clearwell:	12.03 Feet	#1 PM Pressure:	61 PSI
River Level:	16.66 Feet	#2 PM Pressure:	63 PSI
River Flow:	11835 GPM	#1 Mill H20 Pump:	
City H20:	0 GPM	#2 Mill H20 Pump:	
#1 Mill Flow:	6605 GPM	#3 Mill H20 Pump:	
#2 Mill Flow:	6892 GPM	#4 Mill H20 Pump:	
Well Flow:	1 GPM	#5 Mill H20 Pump:	
RW Turbidity:	1 NTU	#6 Mill H20 Pump:	
Chlorine:	1 GPM		
7Q10 Balance:	-1300 GPM		
#1 RWC Turbid	-1298 GPM		
#2 RWC Turbid	-1298 GPM		



Energy Cost

Real Time Electricity Price Beginning Hour +1 = 4.172 cents/kWh 10/2/2009 3:00:00 PM



Fuel Cost $/MMBTU

Coal:	16.02 MGD
TDF:	16.02 MGD
No. 2 Oil:	16.02 MGD
Natural Gas:	16.02 MGD

This Hour Power Price: 16.02 MGD

Power Gen, Purchases, Sales

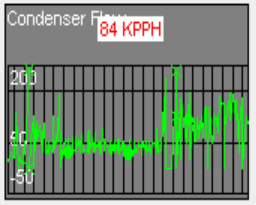
TG1 Output:	24.94 MWATTS
TG2 Output:	Under Range
Power Purch/Sales:	-40.85 MW

Buy vs Generate Spreadsheet

PM 1 Speed	4006
PM 1 Break	W F D E
PM 2 Speed	4817
PM 2 Break	W F D E

Steam Turbine - TG1

Inlet Steam Flow:	409 KPPH
Inlet Pressure:	1243 PSIG
Inlet Temp:	939 DEGF
Sodium:	0 PPB
350 Ext Flow:	5 KPPH
175 Ext Flow:	30 KPPH
80 Ext Flow:	304 KPPH
Cond Flow:	84 KPPH
Vacuum:	-25.10 IN HG
Hotwell Lvl:	50 PCT
Lube Oil Temp:	130 DEG F
Gen Cold Gas:	116 DEG F



Wastewater

Lift Station Level:	91 %
Lift Station Flow:	16274 GPM
Lift Station PH:	7.80 PH
No.1 Sec. WWC Turbidity:	
No.2 Sec. WWC Turbidity:	21
Holding Pond sCOD:	16.01 MGD
Holding Pond Flow:	16.01 MGD
Daily Holding Pond TSS:	16.01 MGD
Daily Holding Pond BOD:	16.01 MGD
Alum to Sec. Clarfiers:	16.02 MGD
Polymer to Sec. Clarifiers:	16.02 MGD
Nutrient to ASB's:	16.02 MGD
Primary #1 Torque:	16.02 MGD
Primary #2 Torque:	16.02 MGD
Primary 1 Bed Level:	16.02 MGD
Primary 2 Bed Level:	16.02 MGD

DMW/Cond

Demin Level:	81 %
DMW flow:	0 KPPH
Condensate Flow:	500 GPM
Condensate Return:	
PM1 Cond Reclaim Vlv:	27 %
DI1 Cond Reclaim Vlv:	0 %
PM2 Cond Reclaim Vlv:	40 %
DI2 Cond Reclaim Vlv:	40 %

Mill Air PSIG:	107	#1	104%
Inst Air PSIG:	94	#2	0 %
		#3	111%
		#4	102%
		#5	0 %
		PM	106%

PB1

Steam Flow:	-0 KPPH
Coal Mill 1:	0 KPPH
Coal Mill 2:	0 KPPH
Burner 1 Ign:	1 VDC
Burner 1 Main:	1 VDC
Burner 2 Ign:	3 VDC
Burner 2 Main:	1 VDC
Burner 3 Ign:	1 VDC
Burner 3 Main:	2 VDC
Burner 4 Ign:	3 VDC
Burner 4 Main:	2 VDC

PB1 Drum Level Trend: 14.45 IN

PB1 O2 Trend: Bad Input

PB1 Opacity Trend: 1.12 %

PB2

Steam Flow:	421 kpph
BFW Flow:	452 KPPH
Steam Temp:	946 DEG F
SO2:	0.21 #/MMBTU
Bed Pressure:	17 IN
Bed Temp:	1616 DEG F
Stack O2	7 %
ID Fan Load:	97 %FLA
PA Fan Load:	112 %FLA
Sec. Fan Load:	110 % FLA
ID Inlet Draft:	20 IN
Furnace Draft:	2 IN
Econ Out:	546 DEG F
Windbox:	65 IN
TR1 Pwr:	4475 VA
TR2 Pwr:	8979 VA
TR3 Pwr:	5370 VA
Total Pwr:	18833 VA
PB2 Nat Gas:	119
Mill 1 Coal:	16 KPPH
Mill 2 Coal:	Bad Input
TDF:	5 KPPH
S Drag:	65 KPPH
N Drag:	28 KPPH
B. Ash Screw:	20 %

PB2 Drum Level Trend: 0.52 IN

PB2 O2 Trend: 4.15 % 2.31 %

PB2 Opacity Trend: 33.46 %

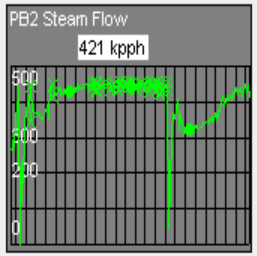
PB2 Tube Leak

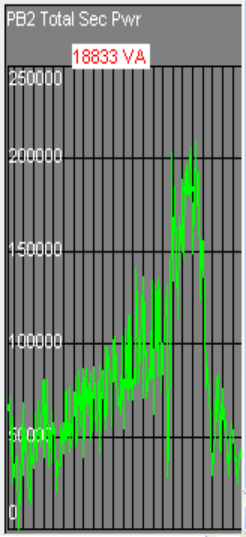
Fly Ash Silo Lvl:	Over Range
Bot. Ash Silo Lvl:	13 %
Flyash Plenum:	12 Inches Hg

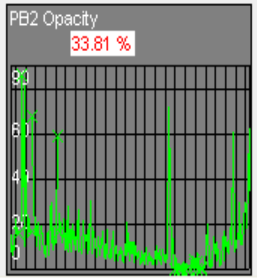
Precipitator Hopper Temperatures

Hopper	916	917	918	919	920	921
Temp F	280	265 Bad Input	270	238	237	

PB2 Trends







Sludge

Screw Press Dryness Blend Tank: 98 %

1. 43	5. 42
2. 53	6. 51
3. 51	7. 43
4. 49	

Belt Scale:	81 KPPH
Transfer Sta Lvl:	
Transfer Sta Flow:	3642
#1 Primary Flow:	1011 GPM
#2 Primary Flow:	2286 GPM
Diversion Time:	0 Seconds

Polymer Consumption		Table Flows
GT 1:	3.79 LB/T	718.01 GPM
GT 2:	4.92 LB/T	1097.74 GPM
GT 3:	2.49 LB/T	545.42 GPM
GT 4:	7.50 LB/T	910.46 GPM

Chems	
Caustic	30 %
Acid	73 %
Alum	95 %
Nutrient	41 %

Mill Dashboard | Troubleshooting Trends

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River Flow:	11835 GPM	#1 Mill H20 Pump:	
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#1 Mill Flow:	6605 GPM	#3 Mill H20 Pump:	
#2 Mill Flow:	6892 GPM	#4 Mill H20 Pump:	
Well Flow:	1 GPM	#5 Mill H20 Pump:	
RW Turbidity:	1 NTU	#6 Mill H20 Pump:	
Chlorine:	1 GPM		
7Q10 Balance:	-1300 GPM		
#1 RWC Turbid	-1298 GPM		
#2 RWC Turbid	-1298 GPM		

Clearwell Level (12.1 / 11.8 / 11.4)

Energy Cost

Real Time Electricity Price Beginning Hour +1 = 4.172 cents/kWh 10/2/2009 3:00:00 PM

Total Energy Cost $/ton — Current Total Mill Energy Cost: 80 $/Ton (250 / 200 / 150 / 100 / 50 / 0)

10/1/2009 3:27:53.848 PM 10/2/2009 3:27:53.848 PM

Fuel Cost $/MMBTU

Coal:	16.02 MGD
TDF:	16.02 MGD
No. 2 Oil:	16.02 MGD
Natural Gas:	16.02 MGD

This Hour Power Price: 16.02 MGD

Power Gen, Purchases, Sales

TG1 Output:	24.94 MWATTS
TG2 Output:	Under Range
Power Purch/Sales:	-40.85 MW

Buy vs Generate Spreadsheet

PM 1 Speed	4006
PM 1 Break	W F D E
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PM 2 Break	W F D E

Steam Turbine - TG1

Inlet Steam Flow:	409 KPPH
Inlet Pressure:	1243 PSIG
Inlet Temp:	939 DEGF
Sodium:	0 PPB
350 Ext Flow:	5 KPPH
175 Ext Flow:	30 KPPH
80 Ext Flow:	304 KPPH
Cond Flow:	84 KPPH
Vacuum:	-25.1 IN HG
Hotwell Lvl:	50 PCT
Lube Oil Temp:	130 DEG F
Gen Cold Gas:	116 DEG F

Condenser Flow 84 KPPH (200 / 50 / -50)

Wastewater

Lift Station Level:	91 %
Lift Station Flow:	16274 GPM
Lift Station PH:	7.80 PH
No.1 Sec. WWC Turbidity:	
No.2 Sec. WWC Turbidity:	21
Holding Pond sCOD:	16.01 MGD
Holding Pond Flow:	16.01 MGD
Daily Holding Pond TSS:	16.01 MGD
Daily Holding Pond BOD:	16.01 MGD
Alum to Sec. Clarfiers:	16.02 MGD
Polymer to Sec. Clarifiers:	16.02 MGD
Nutrient to ASB's:	16.02 MGD
Primary #1 Torque:	16.02 MGD
Primary 2 Bed Level:	16.02 MGD

Red circle or box indicates operating equipment

DMW/Cond

Demin Level:	81 %
DMW flow:	0 KPPH
Condensate Flow:	500 GPM
Condensate Return:	
PM1 Cond Reclaim Vlv:	27 %
DI1 Cond Reclaim Vlv:	0 %
PM2 Cond Reclaim Vlv:	40 %
DI2 Cond Reclaim Vlv:	40 %

Mill Air PSIG:	107	#1	104%
Inst Air PSIG:	94	#2	0 %
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		#4	102%
		#5	0 %
		PM	106%

PB1

Steam Flow:	-0 KPPH
Coal Mill 1:	0 KPPH
Coal Mill 2:	0 KPPH
Burner 1 Ign:	1 VDC
Burner 1 Main:	1 VDC
Burner 2 Ign:	3 VDC
Burner 2 Main:	1 VDC
Burner 3 Ign:	1 VDC
Burner 3 Main:	2 VDC
Burner 4 Ign:	3 VDC
Burner 4 Main:	2 VDC

PB1 Drum Level Trend: 14.45 IN

PB1 O2 Trend: Bad Input

PB1 Opacity Trend: 1.12 %

PB2

Steam Flow:	421 kpph
BFW Flow:	452 KPPH
Steam Temp:	946 DEG F
SO2:	0.21 #/MMBTU
Bed Pressure:	17 IN
Bed Temp:	1616 DEG F
Stack O2	7 %
ID Fan Load:	97 %FLA
PA Fan Load:	112 %FLA
Sec. Fan Load:	110 % FLA
ID Inlet Draft:	20 IN
Furnace Draft:	2 IN
Econ Out:	546 DEG F
Windbox:	65 IN
TR1 Pwr:	4475 VA
TR2 Pwr:	8979 VA
TR3 Pwr:	5370 VA
Total Pwr:	18833 VA
PB2 Nat Gas:	119
Mill 1 Coal:	16 KPPH
Mill 2 Coal:	Bad Input
TDF:	5 KPPH
S Drag:	65 KPPH
N Drag:	28 KPPH
B. Ash Screw:	20 %

PB2 Drum Level Trend: 0.52 IN

PB2 O2 Trend: 4.15 % 2.31 %

PB2 Opacity Trend: 33.46 %

PB2 Tube Leak

Fly Ash Silo Lvl:	Over Range
Bot. Ash Silo Lvl:	13 %
Flyash Plenum:	12 Inches Hg

Precipitator Hopper Temperatures

Hopper	916	917	918	919	920	921
Temp F	280	265 Bad Input	270	238	237	

PB2 Trends

PB2 Steam Flow 421 kpph

PB2 Total Sec Pwr 18833 VA

33.81 %

Red = Running or Non-Standard

Blue = Data no available

Yellow = Bad Input

Sludge

Screw Press Dryness Blend Tank: 98 %

1. 43	5. 42
2. 53	6. 51
3. 51	7. 43
4. 49	

Belt Scale:	81 KPPH
Transfer Sta Lvl:	
Transfer Sta Flow:	3642
#1 Primary Flow:	1011 GPM
#2 Primary Flow:	2286 GPM
Diversion Time:	0 Seconds

Polymer Consumption		Table Flows
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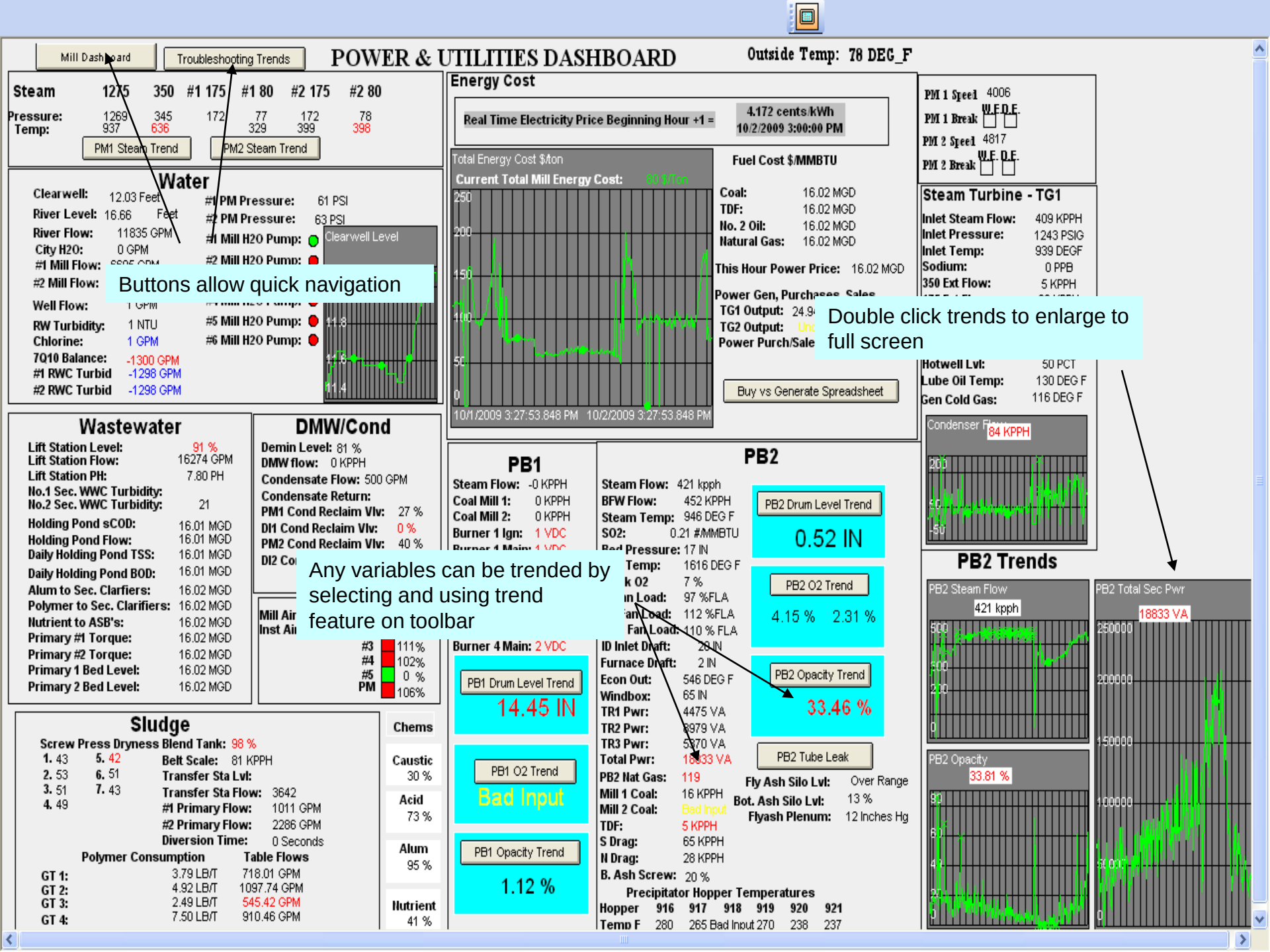
Mill Dashboard
Troubleshooting Trends
POWER & UTILITIES DASHBOARD
Outside Temp: 78 DEG_F
Steam 1275 350 #1 175 #1 80 #2 175 #2 80
Pressure: 1269 345 172 77 172 78
Temp: 937 636 329 399 398
PM1 Steam Trend
PM2 Steam Trend
Energy Cost
Real Time Electricity Price Beginning Hour +1 = 4.172 cents/kWh 10/2/2009 3:00:00 PM
Total Energy Cost $/ton
Current Total Mill Energy Cost: 80 $/Ton
10/1/2009 3:27:53.848 PM 10/2/2009 3:27:53.848 PM
Fuel Cost $/MMBTU
Coal: 16.02 MGD
TDF: 16.02 MGD
No. 2 Oil: 16.02 MGD
Natural Gas: 16.02 MGD
This Hour Power Price: 16.02 MGD
Power Gen, Purchases, Sales
TG1 Output: 24.9
TG2 Output:
Power Purch/Sale
Buy vs Generate Spreadsheet
PM 1 Speed 4006
PM 1 Break W F D E
PM 2 Speed 4817
PM 2 Break W F D E
Steam Turbine - TG1
Inlet Steam Flow: 409 KPPH
Inlet Pressure: 1243 PSIG
Inlet Temp: 939 DEGF
Sodium: 0 PPB
350 Ext Flow: 5 KPPH
Hotwell Lvl: 50 PCT
Lube Oil Temp: 130 DEG F
Gen Cold Gas: 116 DEG F
Condenser Flow 84 KPPH
Water
Clearwell: 12.03 Feet
River Level: 16.66 Feet
River Flow: 11835 GPM
City H2O: 0 GPM
#1 Mill Flow:
#2 Mill Flow:
Well Flow: 1 GPM
RW Turbidity: 1 NTU
Chlorine: 1 GPM
7Q10 Balance: -1300 GPM
#1 RWC Turbid -1298 GPM
#2 RWC Turbid -1298 GPM
#1 PM Pressure: 61 PSI
#2 PM Pressure: 63 PSI
#1 Mill H2O Pump:
#2 Mill H2O Pump:
#5 Mill H2O Pump:
#6 Mill H2O Pump:
Clearwell Level
Buttons allow quick navigation
Double click trends to enlarge to full screen
Wastewater
Lift Station Level: 91 %
Lift Station Flow: 16274 GPM
Lift Station PH: 7.80 PH
No.1 Sec. WWC Turbidity:
No.2 Sec. WWC Turbidity: 21
Holding Pond sCOD: 16.01 MGD
Holding Pond Flow: 16.01 MGD
Daily Holding Pond TSS: 16.01 MGD
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Alum to Sec. Clarfiers: 16.02 MGD
Polymer to Sec. Clarifiers: 16.02 MGD
Nutrient to ASB's: 16.02 MGD
Primary #1 Torque: 16.02 MGD
Primary #2 Torque: 16.02 MGD
Primary 1 Bed Level: 16.02 MGD
Primary 2 Bed Level: 16.02 MGD
DMW/Cond
Demin Level: 81 %
DMW flow: 0 KPPH
Condensate Flow: 500 GPM
Condensate Return:
PM1 Cond Reclaim Vlv: 27 %
DI1 Cond Reclaim Vlv: 0 %
PM2 Cond Reclaim Vlv: 40 %
Any variables can be trended by selecting and using trend feature on toolbar
#3 111%
#4 102%
#5 0 %
PM 106%
PB1
Steam Flow: -0 KPPH
Coal Mill 1: 0 KPPH
Coal Mill 2: 0 KPPH
Burner 1 Ign: 1 VDC
Burner 4 Main: 2 VDC
PB1 Drum Level Trend
14.45 IN
PB1 O2 Trend
Bad Input
PB1 Opacity Trend
1.12 %
PB2
Steam Flow: 421 kpph
BFW Flow: 452 KPPH
Steam Temp: 946 DEG F
SO2: 0.21 #/MMBTU
Bed Pressure: 17 IN
Temp: 1616 DEG F
k O2 7 %
n Load: 97 %FLA
an Load: 112 %FLA
Fan Load: 110 % FLA
ID Inlet Draft: 20 IN
Furnace Draft: 2 IN
Econ Out: 546 DEG F
Windbox: 65 IN
TR1 Pwr: 4475 VA
TR2 Pwr: 8979 VA
TR3 Pwr: 5370 VA
Total Pwr: 18833 VA
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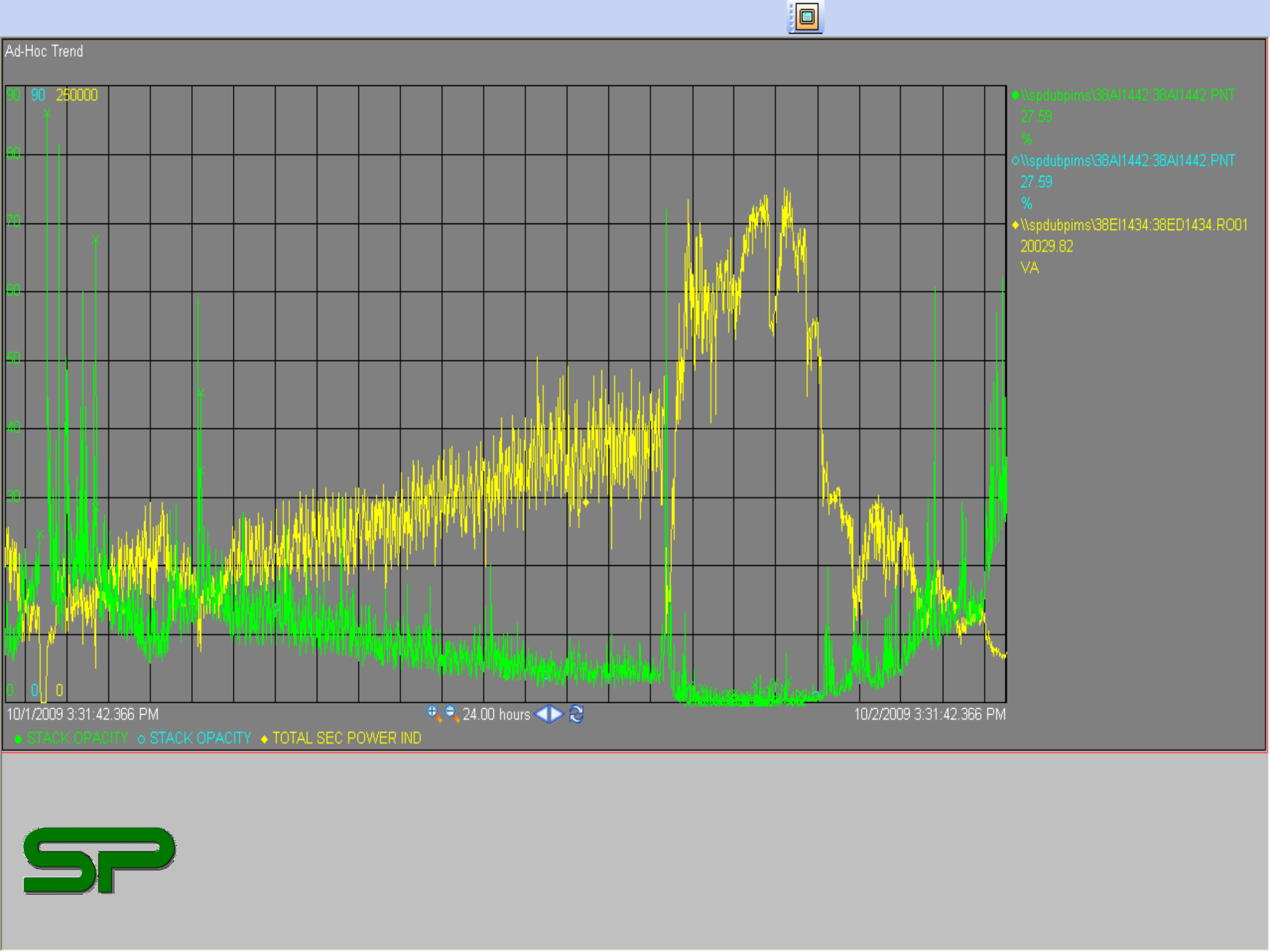
Mill 1 Coal: 16 KPPH
Mill 2 Coal: Bad Input
TDF: 5 KPPH
S Drag: 65 KPPH
N Drag: 28 KPPH
B. Ash Screw: 20 %
PB2 Drum Level Trend
0.52 IN
PB2 O2 Trend
4.15 % 2.31 %
PB2 Opacity Trend
33.46 %
PB2 Tube Leak
Fly Ash Silo Lvl: Over Range
Bot. Ash Silo Lvl: 13 %
Flyash Plenum: 12 Inches Hg
Precipitator Hopper Temperatures
Hopper 916 917 918 919 920 921
Temp F 280 265 Bad Input 270 238 237
PB2 Trends
PB2 Steam Flow
421 kpph
PB2 Total Sec Pwr
18833 VA
PB2 Opacity
33.81 %
Sludge
Screw Press Dryness Blend Tank: 98 %
1. 43 5. 42
2. 53 6. 51
3. 51 7. 43
4. 49
Belt Scale: 81 KPPH
Transfer Sta Lvl:
Transfer Sta Flow: 3642
#1 Primary Flow: 1011 GPM
#2 Primary Flow: 2286 GPM
Diversion Time: 0 Seconds
Polymer Consumption Table Flows
GT 1: 3.79 LB/T 718.01 GPM
GT 2: 4.92 LB/T 1097.74 GPM
GT 3: 2.49 LB/T 545.42 GPM
GT 4: 7.50 LB/T 910.46 GPM
Chems
Caustic 30 %
Acid 73 %
Alum 95 %
Nutrient 41 %


Ad-Hoc Trend
90 90 250000
0 0 0
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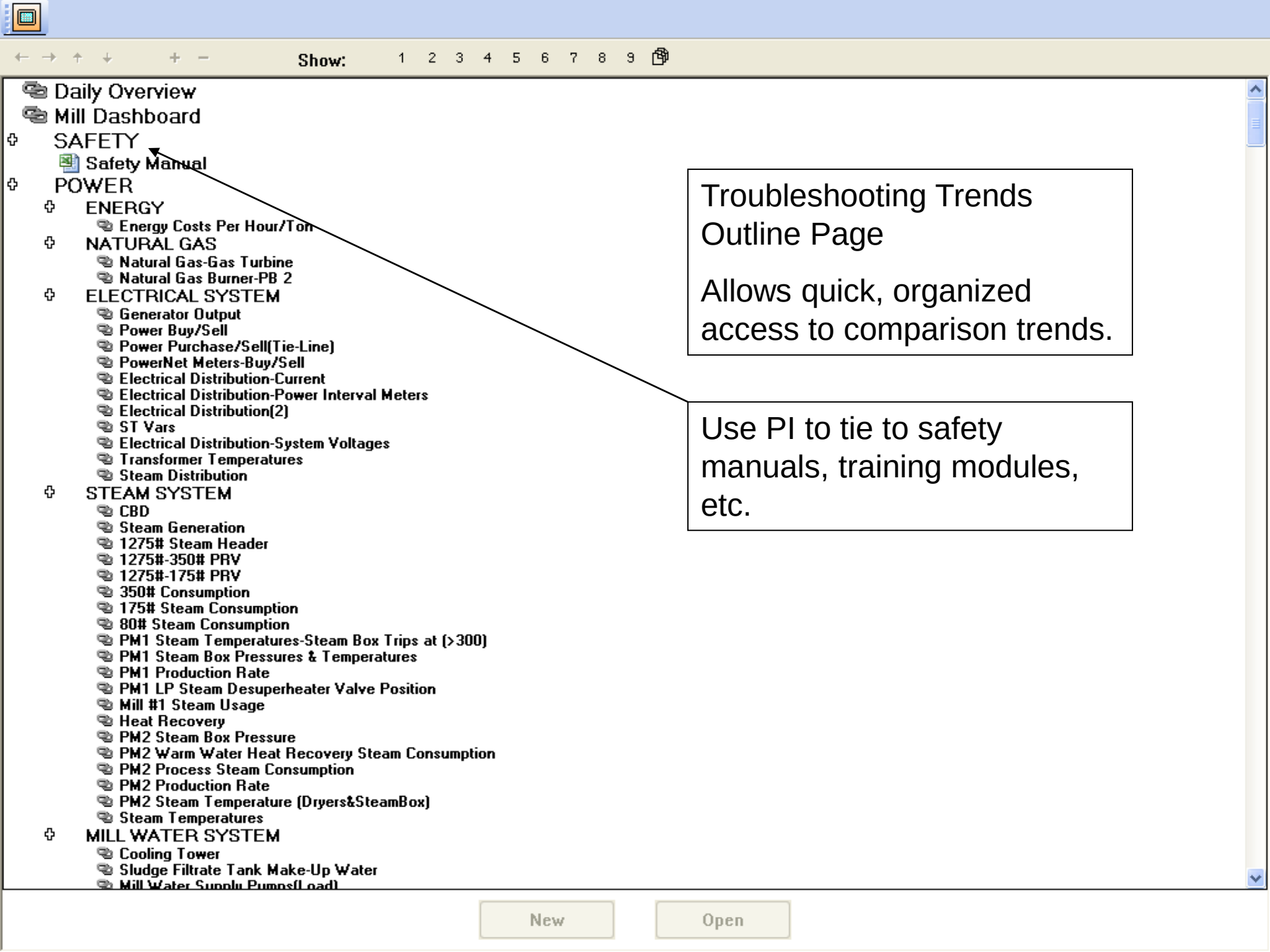
27.59
%
\\spdubpims\38AI1442:38AI1442.PNT
27.59
%
\\spdubpims\38EI1434:38ED1434.RO01
20029.82
VA
10/1/2009 3:31:42.366 PM
24.00 hours
10/2/2009 3:31:42.366 PM
STACK OPACITY
STACK OPACITY
TOTAL SEC POWER IND


Show: 1 2 3 4 5 6 7 8 9
Daily Overview
Mill Dashboard
SAFETY
Safety Manual
POWER
ENERGY
Energy Costs Per Hour/Ton
NATURAL GAS
Natural Gas-Gas Turbine
Natural Gas Burner-PB 2
ELECTRICAL SYSTEM
Generator Output
Power Buy/Sell
Power Purchase/Sell(Tie-Line)
PowerNet Meters-Buy/Sell
Electrical Distribution-Current
Electrical Distribution-Power Interval Meters
Electrical Distribution(2)
ST Vars
Electrical Distribution-System Voltages
Transformer Temperatures
Steam Distribution
STEAM SYSTEM
CBD
Steam Generation
1275# Steam Header
1275#-350# PRV
1275#-175# PRV
350# Consumption
175# Steam Consumption
80# Steam Consumption
PM1 Steam Temperatures-Steam Box Trips at (>300)
PM1 Steam Box Pressures & Temperatures
PM1 Production Rate
PM1 LP Steam Desuperheater Valve Position
Mill #1 Steam Usage
Heat Recovery
PM2 Steam Box Pressure
PM2 Warm Water Heat Recovery Steam Consumption
PM2 Process Steam Consumption
PM2 Production Rate
PM2 Steam Temperature (Dryers&SteamBox)
Steam Temperatures
MILL WATER SYSTEM
Cooling Tower
Sludge Filtrate Tank Make-Up Water
Mill Water Supply Pumps(Load)
Troubleshooting Trends Outline Page
Allows quick, organized access to comparison trends.
Use PI to tie to safety manuals, training modules, etc.
New
Open

PI Visual Controls - Benefits

- Provides “at-a-glance” knowledge of trouble areas
- “Call” Managers, who may not be familiar with an operation know what questions to ask
- Operators know what questions will be asked, so they take action, they become involved
- Troubleshooting is simplified, saving time – Remember purpose of Lean is “Elimination of Waste”

PI Visual Controls - Benefits

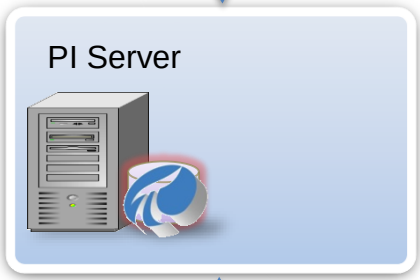
- Conservatively in the last 6 months
  - Reduced coal cost by $200,000 by minimizing turbine condenser flow
  - Reduced Paper Machine lost time by 30 minutes per month due to tighter control of steam condition
  - Reduced steam to feedwater heaters – $80,000

SP Newsprint PI System

Existing Architecture

PI Thick Clients
ProcessBook and Data Link

Individual Users: 20
Concurrent Users: 10



License Size: 20000
Advanced Server Pack
Data Access Pack

Interfaces:
Foxboro AP51 (TCP/IP)
- Utilities
- Deink
- Paper Machine 1
- Paper Machine 2

OPC Interfaces
- PM1 Honeywell Gauging System
- PM2 Honeywell Gauging System
- Winders 1, 2, & 3 PLC's
- Simpatic Contaminant Meters

Other Initiatives

- Reduce Process Variability
  - Continuous Process Monitor, Matrikon
- Email notifications
  - Possibly PI-Notifications
- Real-time Costing
  - Possibly PI-ACE

Questions

- Questions?

Thank you

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