

The background of the image is a dark blue gradient with a faint, stylized cityscape of San Francisco, including the Golden Gate Bridge and the Transamerica Pyramid. The OSIsoft logo is positioned at the top center.

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# The Path Towards Asset Performance Management with the PI System and Ekho

Presented by **Dominique St. Pierre Boucher**  
**Andrea Roy** (EkhoSoft)



# Presentation Overview

- Introduction to Kruger
- Business Requirements in the Paper Mills
- Phase 1 Installation - the PI System with Ekho
- Results Achieved
- PI System Software Being Used
- Phase 2 Installation - the PI System with Ekho
- Asset Performance Management
- Summary



# About Kruger

# About Kruger

- Established in 1904 with headquarters in Montreal (Quebec)
- 35 renewable energy power plants
- 5,000 employees (Canada + U.S.)
- 19 production sites
- 8 industry sectors

## FOUR GENERATIONS



JOSEPH KRUGER



GENE H. KRUGER



JOSEPH KRUGER II



GENE KRUGER II





**TISSUE PRODUCTS**



**ENERGY**



**PUBLICATION PAPERS**



**BIOMATERIALS**



**PACKAGING**



**WINES AND SPIRITS**



**RECYCLING**



**CONTAINERBOARD**



# Business Requirements in the Paper Mills

- Kruger operates 4 integrated Pulp & Paper mills in Eastern Canada, producing around 1.4 MT of pulp & paper products annually
  - Brompton, Quebec
  - Corner Brook, Newfoundland
  - Trois-Rivières, Quebec
  - Wayagamack, Quebec
- Requirement for contemporary systems for real time information, to drive performance improvement initiatives



# Phase 1 Installation

- Corner Brook Mill chosen as the pilot site for the initial installation.
- Chosen because of site complexity, with Woodyard Operations, Multiple TMP Lines, Multiple Paper Machines, onsite Co-Generation Facilities and nearby Hydro Power Plants
- Use of the PI System Infrastructure for real time data collection and analysis
- Use of Ekho software for Millwide Information and Reporting



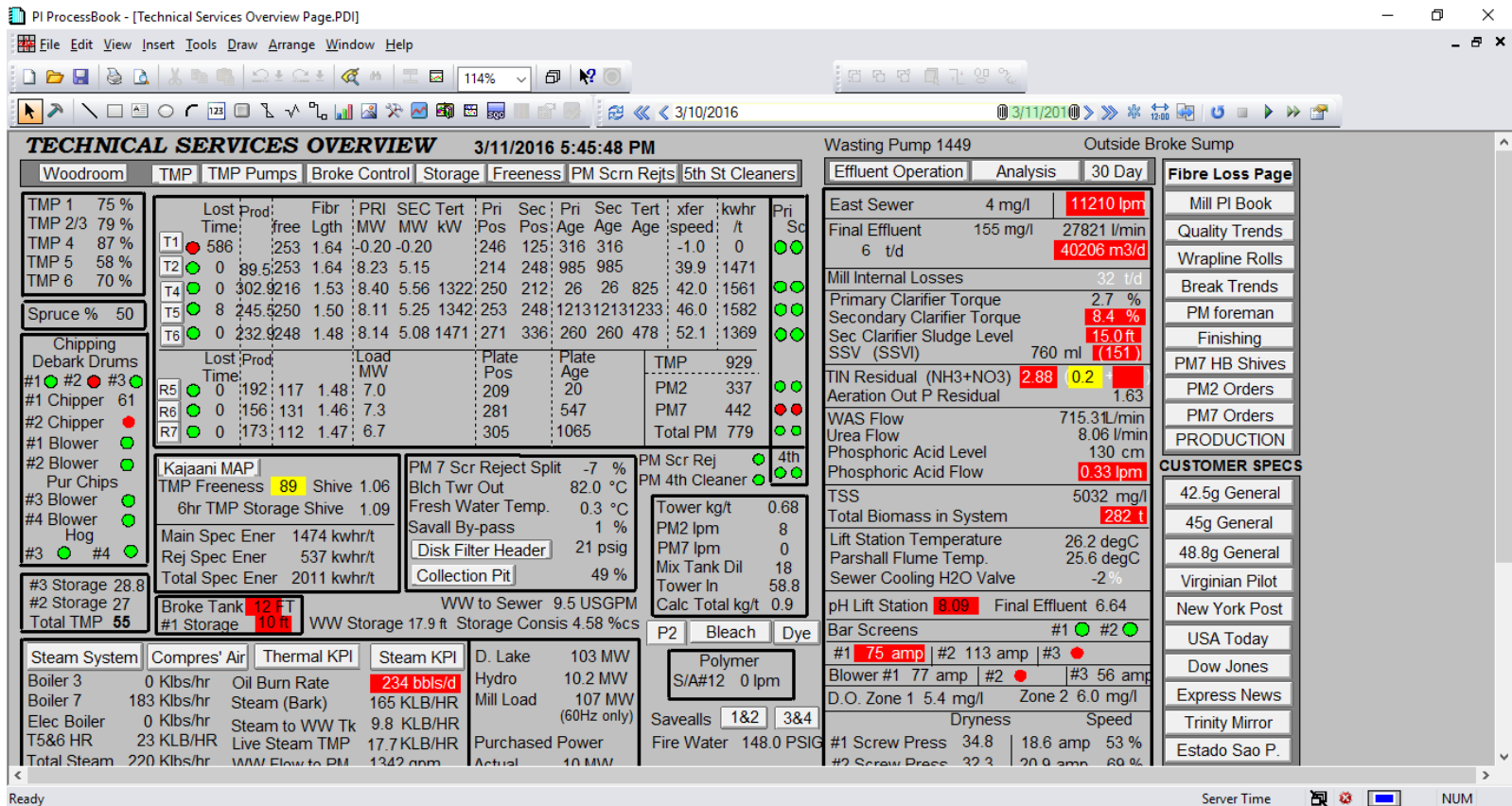
# Results of Phase 1 Installation

The PI System Infrastructure and the Ekho Application software were successfully installed within one year

The combined solution was used to address:

- Production Data Collection and real time monitoring for all areas of the Mill
- Downtime data collection and analysis
- Traceability & Quality Data Management
- Reporting Overall Equipment Effectiveness
- Reporting Energy use and Energy generation across the mill complex
- Providing Management Dashboards, KPI's and Reports

# Real-time Monitoring



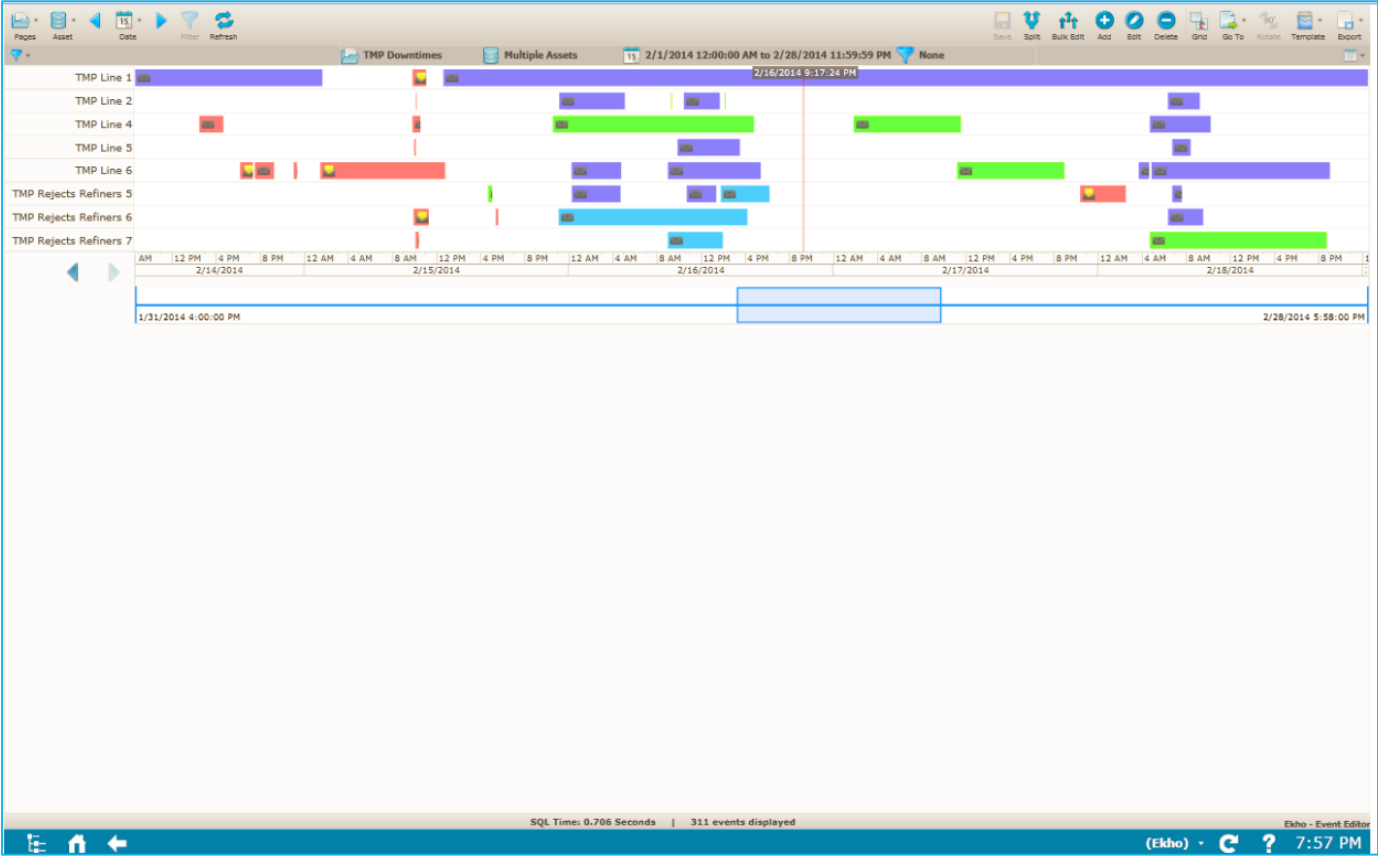
# Event Viewer

TMP Downtimes							
Multiple Assets							
2/1/2014 12:00:00 AM to 2/28/2014 11:59:59 PM							
None							
Comment	Sector Name	Start Time	End Time	Duration	TMP-Level1	TMP-Level2	Duration Hrs
	THP Line 4	2/28/2014 5:45:36 PM	2/28/2014 5:57:52 PM	00:00:12:16	OPERATIONS	LOW LOAD	0.20h
	THP Line 4	2/28/2014 9:02:26 AM	2/28/2014 9:19:20 AM	00:00:16:54	OPERATIONS	LOW LOAD	0.28h
	THP Line 5	2/27/2014 11:36:26 PM	2/27/2014 11:47:37 PM	00:00:11:11	UNSCHEDULED MAINTENANCE	MECHANICAL	0.19h
	THP Rejects Refiners 5	2/27/2014 10:12:46 PM	2/27/2014 10:13:40 PM	00:00:00:54	NON-CONTROLLABLE	OUTSIDE POWER	0.02h
	THP Rejects Refiners 5	2/27/2014 10:10:45 PM	2/27/2014 10:12:38 PM	00:00:01:53	NON-CONTROLLABLE	OUTSIDE POWER	0.03h
	THP Line 5	2/27/2014 9:25:17 PM	2/27/2014 9:31:46 PM	00:00:06:29	UNSCHEDULED MAINTENANCE	MECHANICAL	0.11h
	THP Line 6	2/27/2014 8:26:25 PM	2/27/2014 8:51:35 PM	00:00:25:10	UNSCHEDULED MAINTENANCE	MECHANICAL	0.42h
	THP Line 6	2/27/2014 6:20:45 AM	2/27/2014 8:24:27 PM	00:14:03:42	SCHEDULED MAINTENANCE	PLATE CHANGE	14.06h
	THP Rejects Refiners 5	2/27/2014 5:08:54 PM	2/27/2014 5:11:30 PM	00:00:02:36	NON-CONTROLLABLE	OUTSIDE POWER	0.04h
	THP Line 5	2/27/2014 4:38:44 PM	2/27/2014 4:58:52 PM	00:00:20:08	OPERATIONS	MISCELLANEOUS	0.34h
	THP Line 4	2/27/2014 1:49:54 PM	2/27/2014 1:58:59 PM	00:00:09:05	OPERATIONS	MISCELLANEOUS	0.15h
	THP Rejects Refiners 7	2/27/2014 1:31:12 PM	2/27/2014 1:39:02 PM	00:00:07:50	OPERATIONS	MISCELLANEOUS	0.13h
	THP Rejects Refiners 5	2/27/2014 1:33:10 PM	2/27/2014 1:35:52 PM	00:00:02:42	NON-CONTROLLABLE	OUTSIDE POWER	0.04h
	THP Line 2	2/27/2014 11:31:56 AM	2/27/2014 11:39:51 AM	00:00:07:55	OPERATIONS	MISCELLANEOUS	0.13h
	THP Rejects Refiners 6	2/27/2014 9:16:56 AM	2/27/2014 10:00:16 AM	00:00:43:20	UNSCHEDULED MAINTENANCE	ELECTRICAL	0.72h
	THP Line 1	2/21/2014 4:06:06 PM	2/27/2014 6:41:37 AM	50:14:35:31	NON-CONTROLLABLE	OUTSIDE POWER	134.59h
	THP Line 2	2/27/2014 2:15:23 AM	2/27/2014 2:22:28 AM	00:00:07:05	OPERATIONS	LOW LOAD	0.12h
	THP Line 5	2/26/2014 4:47:42 PM	2/26/2014 4:53:48 PM	00:00:06:06	OPERATIONS	LOW LOAD	0.10h
	THP Rejects Refiners 6	2/26/2014 3:24:33 PM	2/26/2014 3:36:55 PM	00:00:12:22	OPERATIONS	MISCELLANEOUS	0.21h
	THP Rejects Refiners 6	2/26/2014 3:12:07 PM	2/26/2014 3:23:39 PM	00:00:11:32	OPERATIONS	MISCELLANEOUS	0.19h
	THP Rejects Refiners 7	2/26/2014 1:42:36 PM	2/26/2014 1:50:18 PM	00:00:07:42	OPERATIONS	MISCELLANEOUS	0.13h
	THP Rejects Refiners 6	2/26/2014 10:45:09 AM	2/26/2014 11:09:09 AM	00:00:24:00	UNSCHEDULED MAINTENANCE	ELECTRICAL	0.40h
	THP Rejects Refiners 6	2/26/2014 8:35:15 AM	2/26/2014 8:42:57 AM	00:00:07:42	OPERATIONS	MISCELLANEOUS	0.13h
	THP Rejects Refiners 6	2/26/2014 7:08:57 AM	2/26/2014 7:26:04 AM	00:00:17:07	OPERATIONS	MISCELLANEOUS	0.28h
	THP Rejects Refiners 6	2/26/2014 7:02:46 AM	2/26/2014 7:07:46 AM	00:00:05:00	OPERATIONS	MISCELLANEOUS	0.08h
	THP Line 4	2/26/2014 6:55:13 AM	2/26/2014 7:01:52 AM	00:00:06:39	OPERATIONS	LOW LOAD	0.11h
	THP Line 4	2/25/2014 3:26:25 PM	2/25/2014 3:33:31 PM	00:00:07:06	OPERATIONS	HIGH FEEDER	0.12h
	THP Rejects Refiners 7	2/25/2014 3:05:46 PM	2/25/2014 3:16:57 PM	00:00:11:11	OPERATIONS	MISCELLANEOUS	0.19h
	THP Line 2	2/25/2014 1:07:47 PM	2/25/2014 2:28:44 PM	00:01:20:57	UNSCHEDULED MAINTENANCE	INSTRUMENTATION	1.35h
	THP Line 4	2/25/2014 1:10:57 PM	2/25/2014 1:21:46 PM	00:00:10:49	OPERATIONS	MISCELLANEOUS	0.18h
	THP Line 2	2/25/2014 12:18:50 PM	2/25/2014 12:40:18 PM	00:00:21:28	OPERATIONS	MISCELLANEOUS	0.36h
	THP Rejects Refiners 7	2/25/2014 11:06:08 AM	2/25/2014 11:12:44 AM	00:00:06:36	OPERATIONS	MISCELLANEOUS	0.11h
	THP Line 5	2/25/2014 9:06:47 AM	2/25/2014 9:30:21 AM	00:00:23:34	RAW MATERIAL	WOODROOM	0.39h
	THP Line 4	2/25/2014 8:47:32 AM	2/25/2014 8:55:27 AM	00:00:07:55	OPERATIONS	MISCELLANEOUS	0.13h
	THP Line 4	2/25/2014 6:28:59 AM	2/25/2014 6:39:20 AM	00:00:10:21	OPERATIONS	HIGH FEEDER	0.17h
	THP Rejects Refiners 5	2/25/2014 3:41:57 AM	2/25/2014 3:44:14 AM	00:00:02:17	OPERATIONS	LOW LOAD	0.04h
	THP Line 4	2/25/2014 2:43:32 AM	2/25/2014 2:57:34 AM	00:00:13:52	OPERATIONS	HIGH FEEDER	0.23h
	THP Rejects Refiners 5	2/25/2014 12:27:13 AM	2/25/2014 12:30:30 AM	00:00:03:17	OPERATIONS	LOW LOAD	0.06h
	THP Line 6	2/24/2014 9:46:13 PM	2/24/2014 9:50:39 PM	00:00:04:26	OPERATIONS	LOW LOAD	0.07h
	THP Rejects Refiners 6	2/24/2014 8:36:23 PM	2/24/2014 8:38:51 PM	00:00:02:28	OPERATIONS	MISCELLANEOUS	0.04h

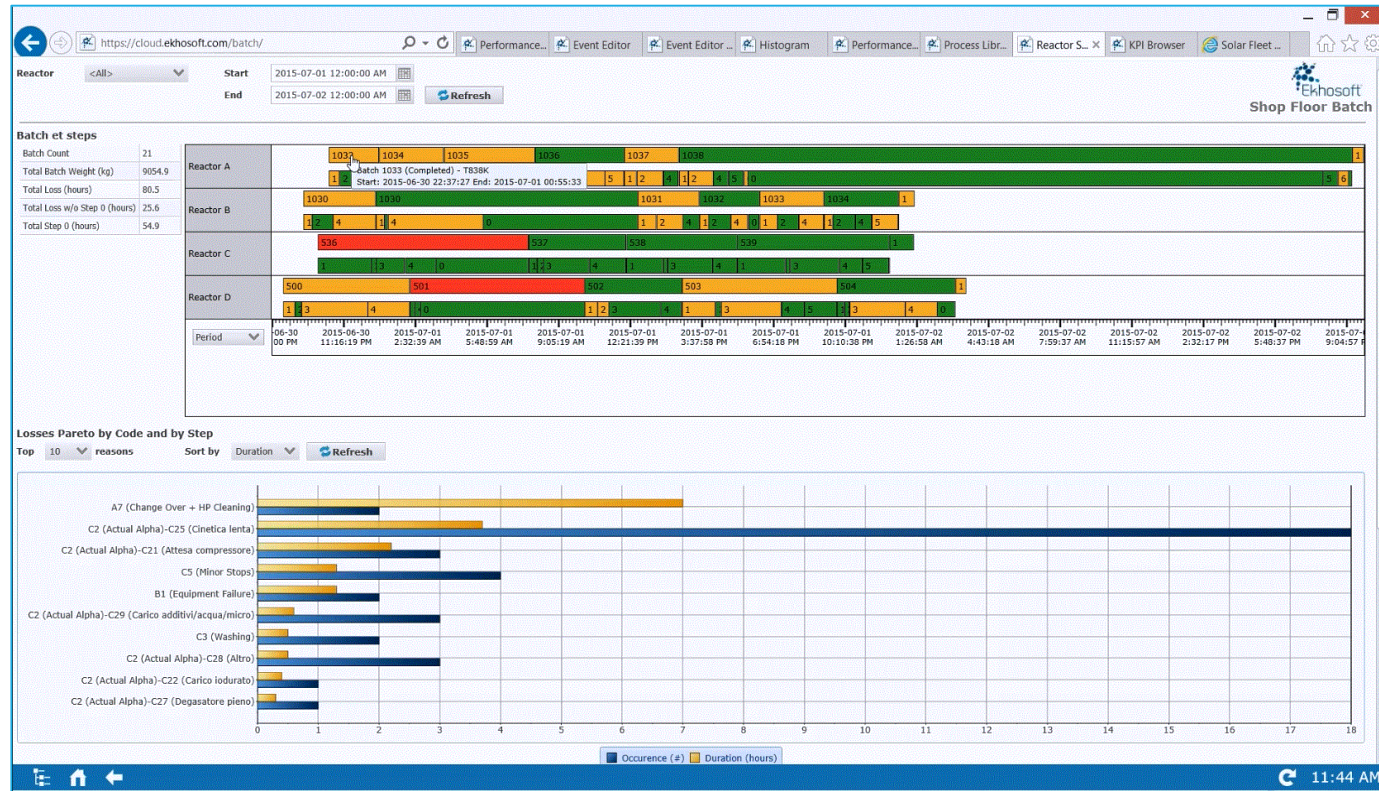
SQL Time: 0.706 Seconds | 311 events displayed

(Ekho) - 7:57 PM

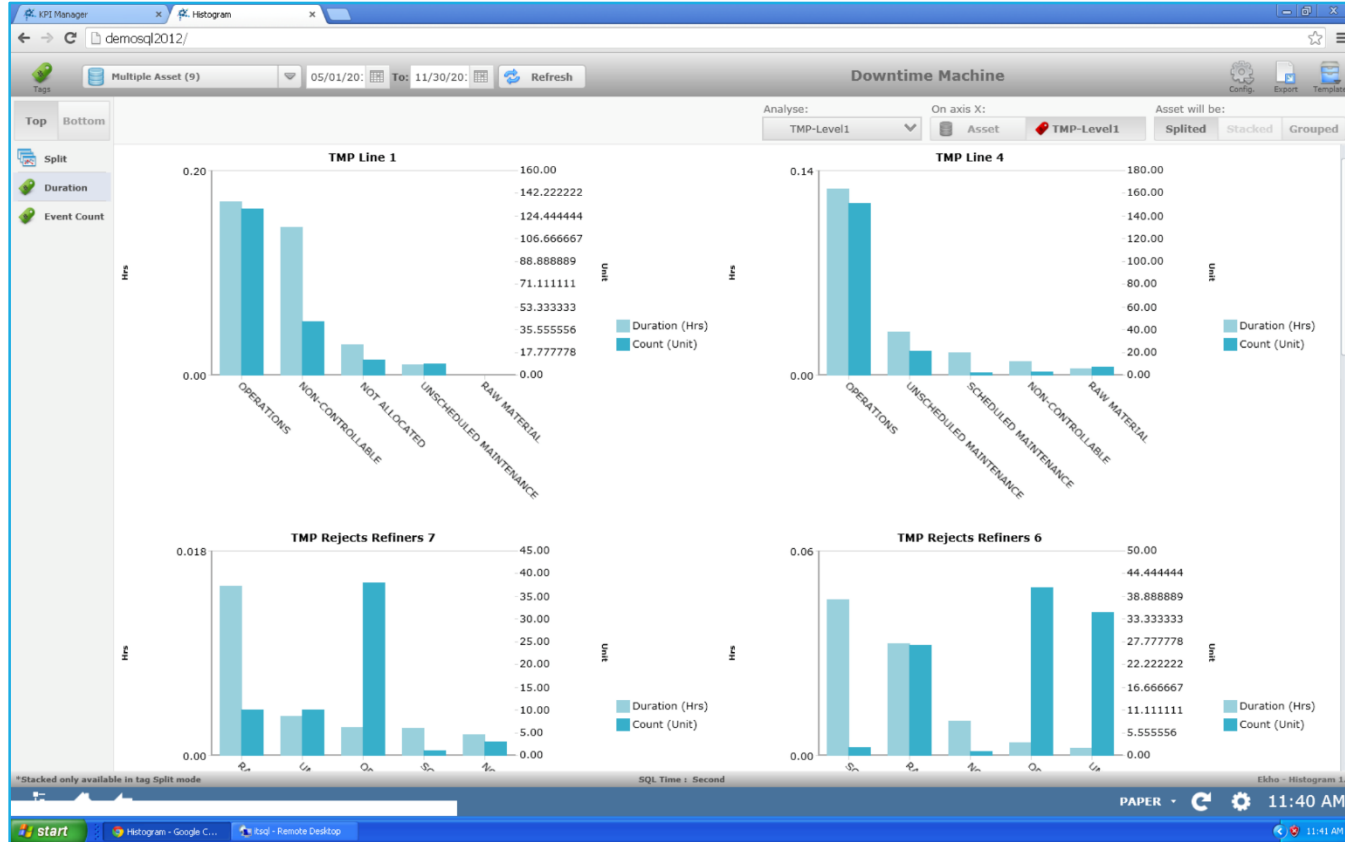
# Graphical Event Viewer



# Production Status

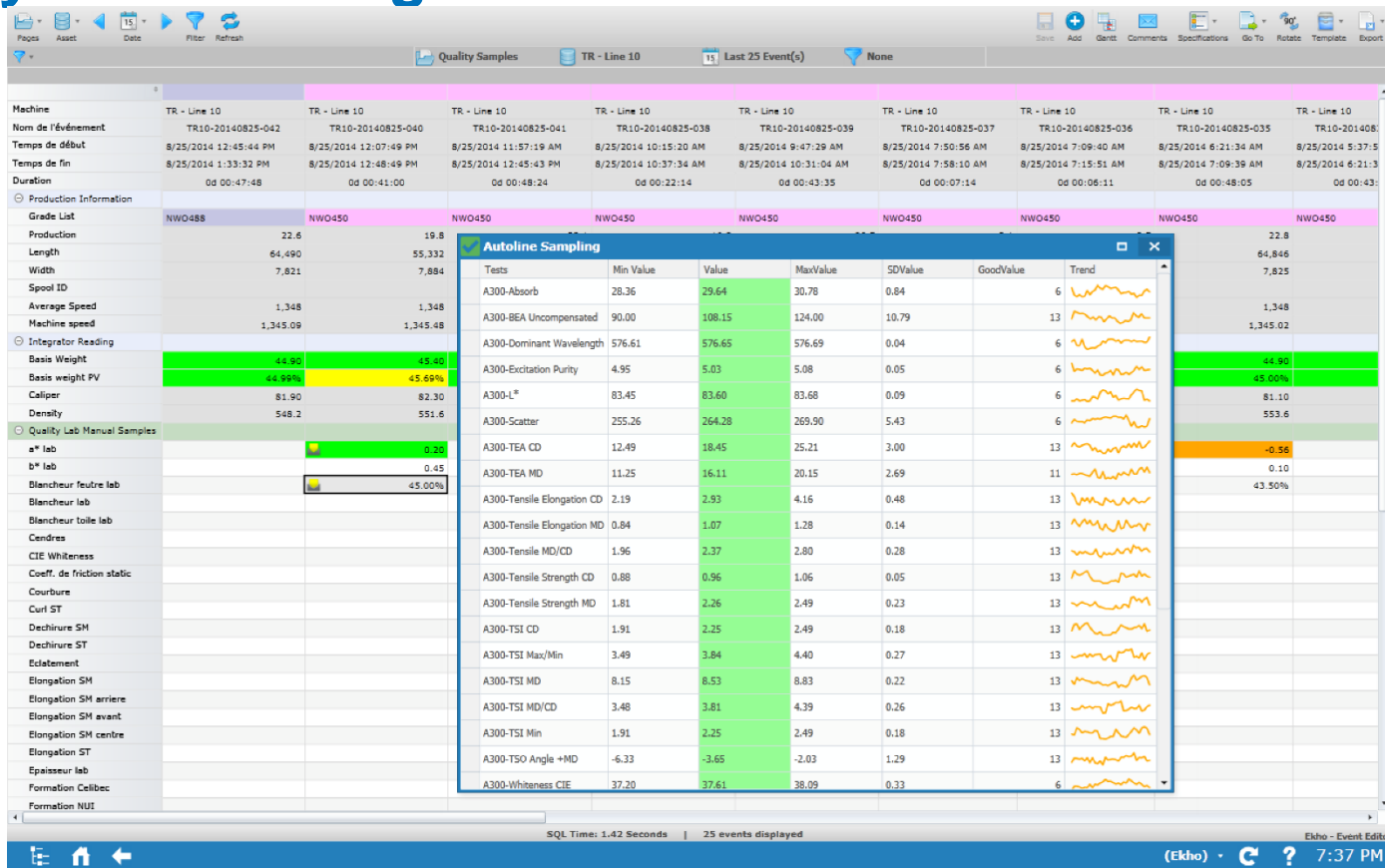


# Downtime Analytics





# Quality Data Management



# Traceability and Genealogy

Assets / Tags

Assets

- CB - Line 2
- CB - Line 7
- TR - Line 10
- TR - Line 7

Reel

Start Time

End Time

CB02-20131231-015	12/31/2013 21:25:05	12/31/2013 22:25:00
CB02-20131231-016	12/31/2013 22:25:01	12/31/2013 23:24:34
CB02-20131231-017	12/31/2013 23:24:35	01/01/2014 00:23:47
CB02-20131231-018	01/01/2014 00:23:48	01/01/2014 01:23:22
CB02-20131231-019	01/01/2014 01:23:23	01/01/2014 02:23:02
CB02-20131231-020	01/01/2014 02:23:03	01/01/2014 03:22:24
CB02-20131231-021	01/01/2014 03:22:25	01/01/2014 04:21:35
CB02-20131231-022	01/01/2014 04:21:36	01/01/2014 05:20:52
CB02-20131231-023	01/01/2014 05:20:53	01/01/2014 06:19:53
CB02-20131231-024	01/01/2014 06:19:54	01/01/2014 07:19:09
CB02-20140101-001	01/01/2014 07:19:10	01/01/2014 08:04:54
CB02-20140101-002	01/01/2014 08:04:31	01/01/2014 09:43:08
CB02-20140101-003	01/01/2014 09:43:09	01/01/2014 10:42:22
CB02-20140101-004	01/01/2014 10:42:23	01/01/2014 11:41:14
CB02-20140101-005	01/01/2014 11:41:15	01/01/2014 12:39:48
CB02-20140101-006	01/01/2014 12:39:49	01/01/2014 13:39:06
CB02-20140101-007	01/01/2014 13:39:07	01/01/2014 14:27:33
CB02-20140101-008	01/01/2014 14:27:33	01/01/2014 15:43:36
CB02-20140101-009	01/01/2014 15:43:37	01/01/2014 16:42:15
CB02-20140101-010	01/01/2014 16:42:16	01/01/2014 17:40:55
CB02-20140101-011	01/01/2014 17:40:56	01/01/2014 18:42:31
CB02-20140101-012	01/01/2014 18:42:32	01/01/2014 19:40:35
CB02-20140101-013	01/01/2014 19:40:36	01/01/2014 20:38:32
CB02-20140101-014	01/01/2014 20:38:33	01/01/2014 21:36:42
CB02-20140101-015	01/01/2014 21:36:43	01/01/2014 22:35:34
CB02-20140101-016	01/01/2014 22:35:35	01/01/2014 23:33:03
CB02-20140101-017	01/01/2014 23:33:04	01/02/2014 00:30:58

RollSet

CB02-20131231-015-1	12/31/2013 22:33:30	12/31/2013 22:44:28
CB02-20131231-015-2	12/31/2013 22:46:23	12/31/2013 22:54:34
CB02-20131231-015-3	12/31/2013 22:56:18	12/31/2013 23:08:07
CB02-20131231-015-4	12/31/2013 23:10:48	12/31/2013 23:20:42

Start Time

End Time

Rolls

N20M31B152A
N20M31B152C
N20M31B152E
N20M31B152G
N20M31B152J

Rolls Report & Analytics

Origin	Test	Value
HTRC Reel Result	Average Speed	902
HTRC Reel Result	Basis Weight	45
HTRC Reel Result	Caliper	79.2
HTRC Reel Result	Density	568.2
HTRC Reel Result	Grade	74
HTRC Reel Result	Jumbo Mill Name	31152
HTRC Reel Result	Jumbo Weight ( HTRC )	
HTRC Reel Result	Length	54235
HTRC Reel Result	Maximum Width at Reel	
HTRC Reel Result	Spool ID	14
Measurex (P) Result	Aquatrol CD	0
Measurex (P) Result	Aquatrol CD Effect	0.376593
Measurex (P) Result	Basis weight MD	100
Measurex (P) Result	Basis weight MD Spread	0.382788
Measurex (P) Result	Basis weight PV	45.0466
Measurex (P) Result	Basis weight CD Spread	1.14917
Measurex (P) Result	Basis weight SP	44.9998
Measurex (P) Result	Basis weight Total Spread	2.2856
Measurex (P) Result	Caliper	97.5204
Measurex (P) Result	Caliper CD	100
Measurex (P) Result	Caliper CD Effect	0.318584
Measurex (P) Result	Caliper CD Spread	0.860378
Measurex (P) Result	Caliper MD Spread	0.541859
Measurex (P) Result	Caliper PV	82.0257
Measurex (P) Result	Caliper Total Spread	1.33642

Assets / Tags

01/01/2014 12:00:00 AM to 01/03/2014 12:00:00 AM Refresh

Export

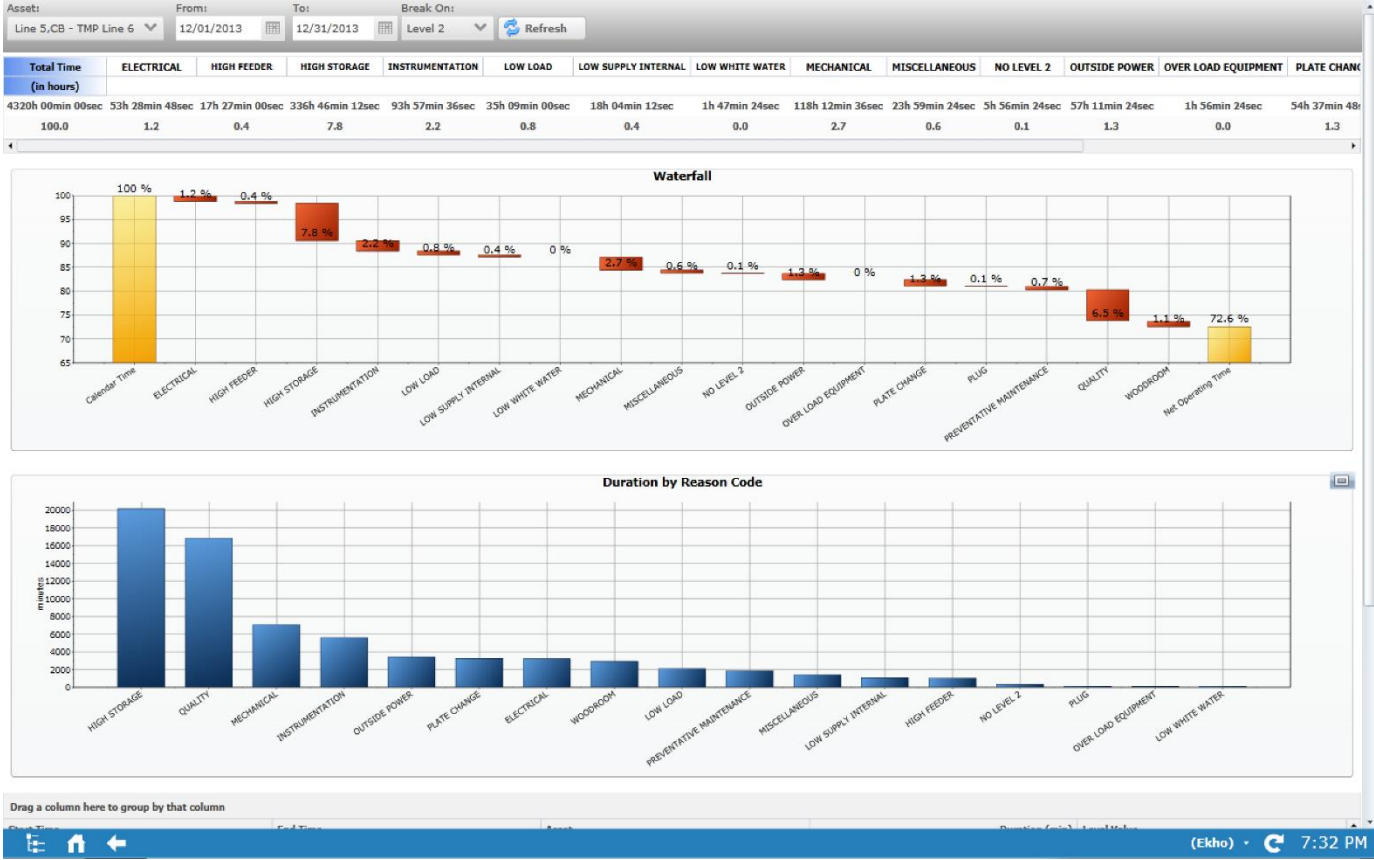
Home

Back

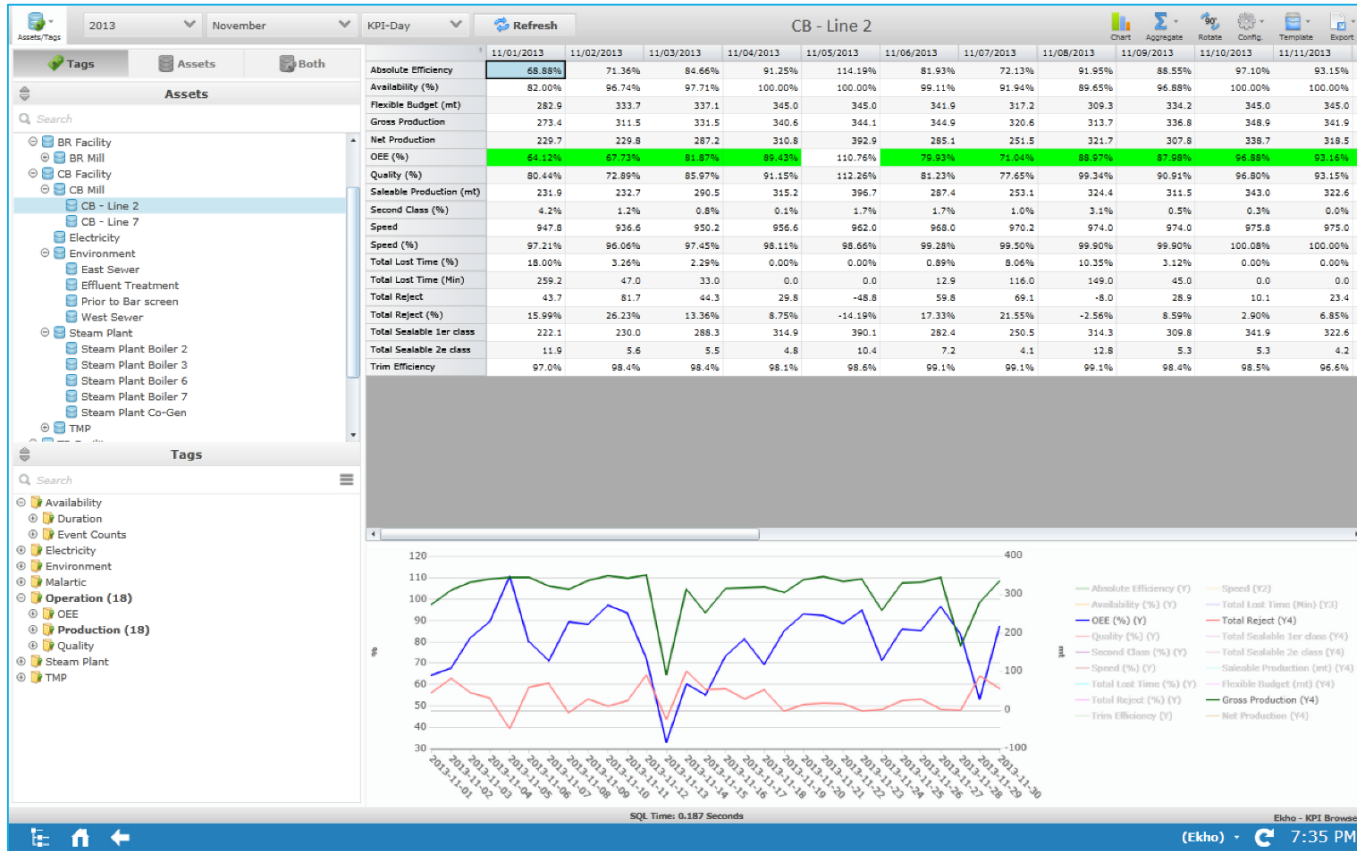
Kruppers - Rolla Info

(Ekho) 7:36 PM

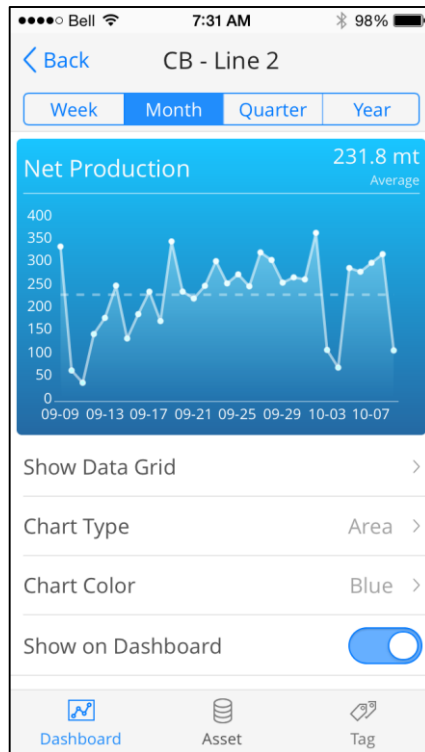
# Overall Equipment Effectiveness



# KPI Drill Down



# Ekho Mobile KPI Views



7:31 AM 98%

Back CB - Line 2

Week Month Quarter Year

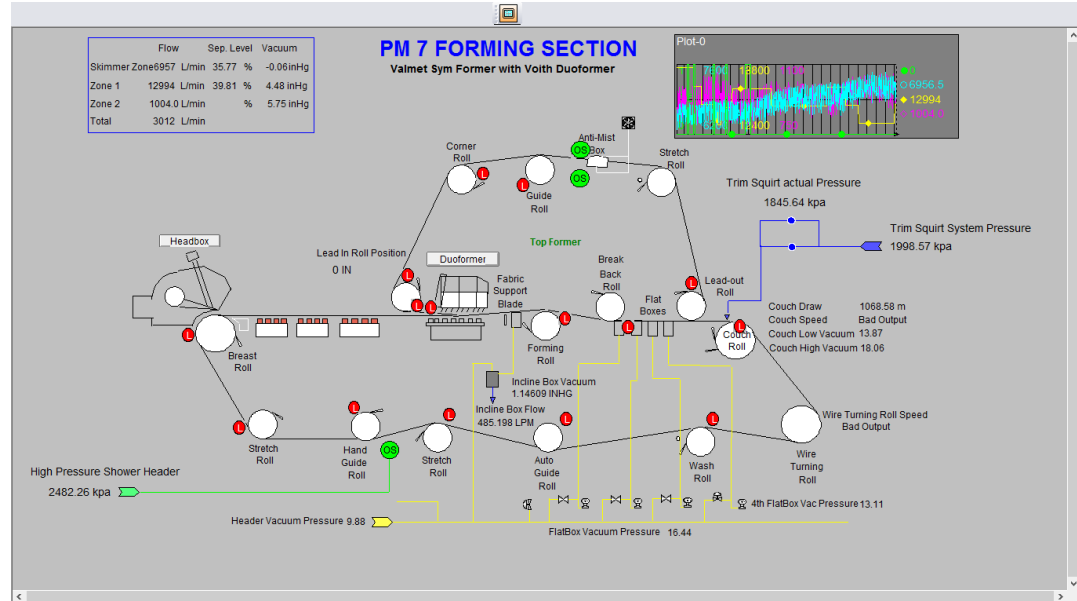
Net Production (mt)

Sep-09-2013	337
Sep-10-2013	66.2
Sep-11-2013	39.3
Sep-12-2013	145.8
Sep-13-2013	181.1
Sep-14-2013	251.6
Sep-15-2013	136.1
Sep-16-2013	189.3
Sep-17-2013	238.4
Sep-18-2013	174.1
Sep-19-2013	348.2

Dashboard Asset Tag

# Benefits Achieved

- Dramatic reduction in manual data collection and manipulation
- Significant increase of data accuracy and quality
- Move to managing with real-time information
- Ability to pinpoint problems before they became crises





## Benefits Achieved (continued)

- Dramatic improvement of visibility of Downtime events and patterns, and associated production losses
- Ability to drill down and cross reference all forms of data
- Ability to relate issues in one area of the mill with problems in other areas of the mill
- Use of Mobile Devices for KPI's and dashboards

# OSIsoft product, component & subcomponent names

- PI API
- PI Coresight
- PI DataLink
- PI Developer Technologies
  - PI OLEDB
  - PI OLEDB Provider
  - PI ODBC
- PI Manual Logger (PI ML)
- PI ProcessBook
- PI SDK
- PI Server
  - PI Data Archive
  - Notifications
- PI Interface
  - PI Interface for OPC DA
  - PI Interface for Foxboro
  - PI Interface for Measurex
  - PI Interface for Universal File and Stream

Contd. on next slide

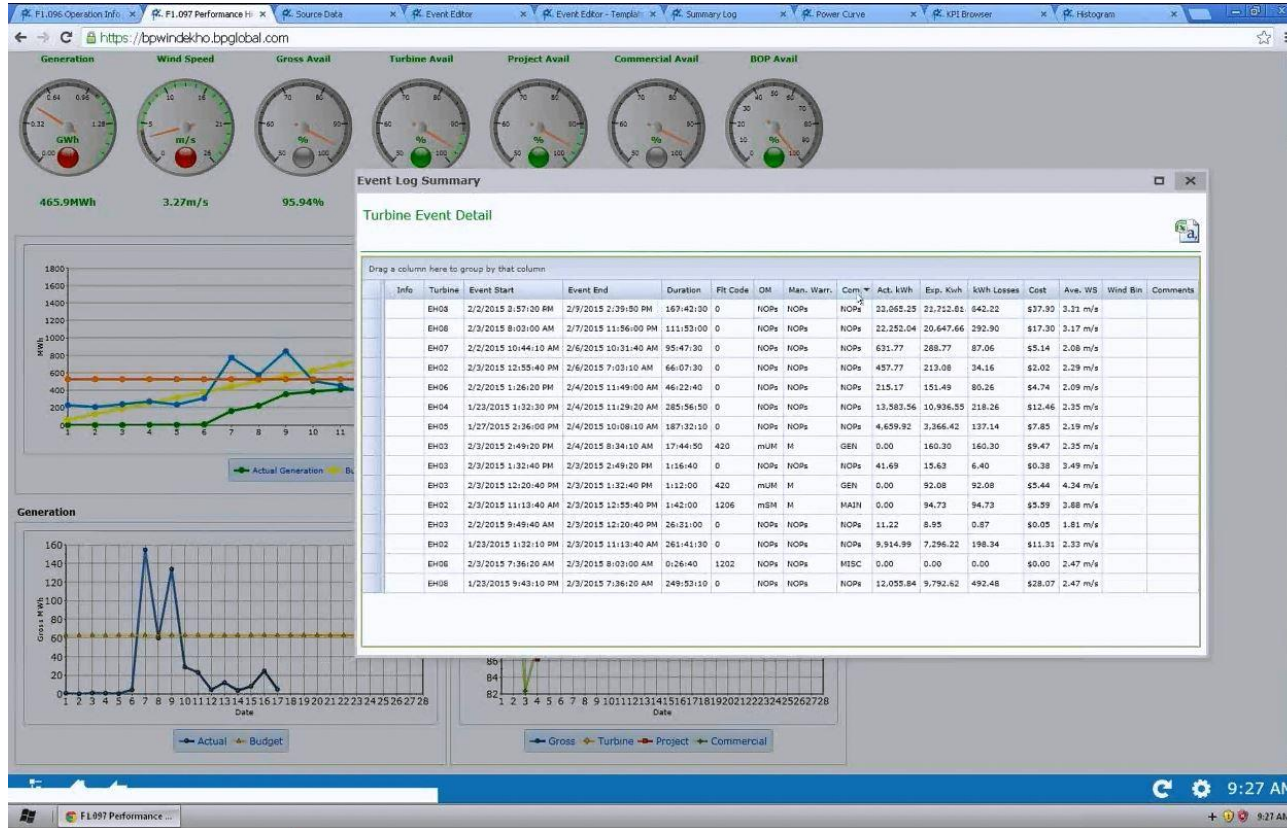
# Re-Assessment before starting Phase 2

- Before proceeding to the other mills, a re-assessment of the requirements was completed
- The scope was changed to include:
  - Standardizing all mills on the PI System. Other historians were in use in two of the mills.
  - Utilizing Asset Framework and Event Frames in the revised roll-out plan
  - Extending the use of Mobile devices for KPI's, Dashboards, and for Mobile Inspection Tours
  - Increasing the focus of the combined solution on Asset Performance Management

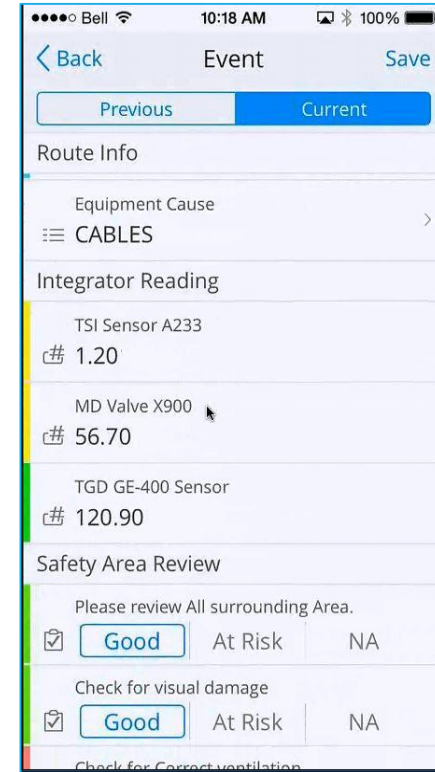
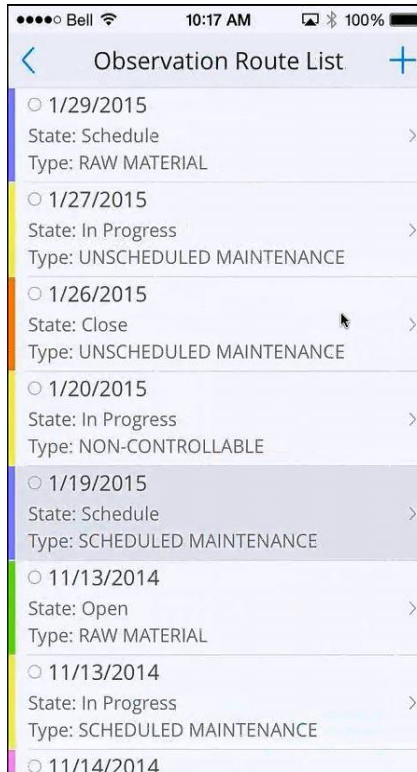
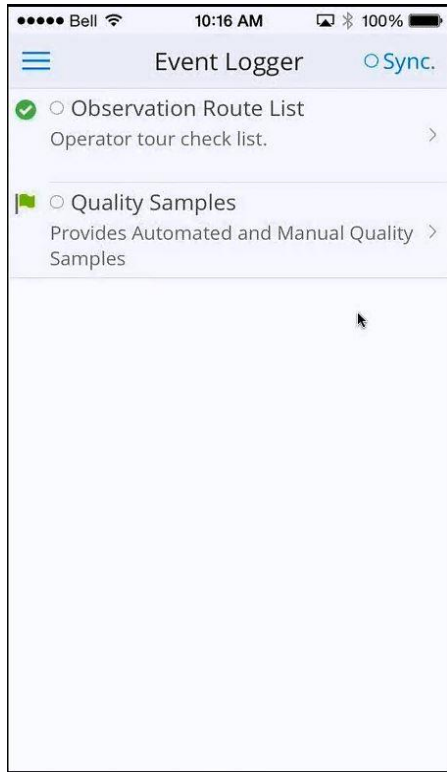
# Current Status of Phase 2 for Wayagamack

- Agreement reached with OSIsoft for standardizing on use of the PI System in all 4 mills
- Initial deployment of the PI Server's Asset Framework and Event Frames have been started
- Configuration of the Ekho software has been started to use the new PI System Software
- Mobile Inspection Tours have been configured in the Ekho software, for Smartphones and Tablets
- Plans are established for an increased focus on Asset Performance Management

# Drill Down to Data in Event Frames



# Mobile Inspection Tours



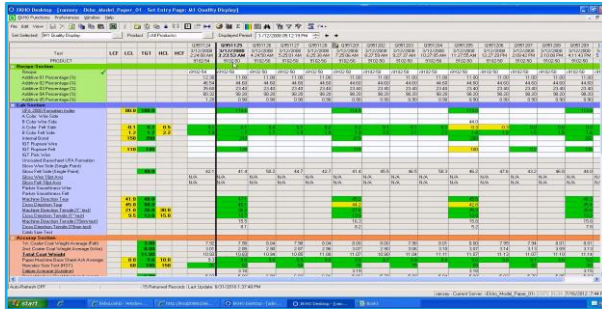




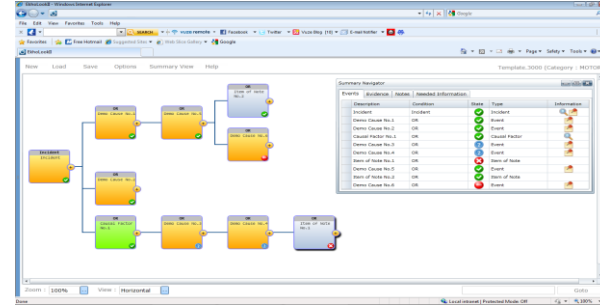
# History of Ekhosoft

- Founded as Inexcon Technology in 2000 (iTt)
- Focused on Process Industries and Renewables
- Software solution is called Ekho
- Application layer designed to sit on top of the **OSIsoft PI System**
- Ekho provides an integrated set of applications for **Asset Performance Management**.
- Company mission is to drive **Performance Improvement** initiatives and **Increase ROI** for our customers

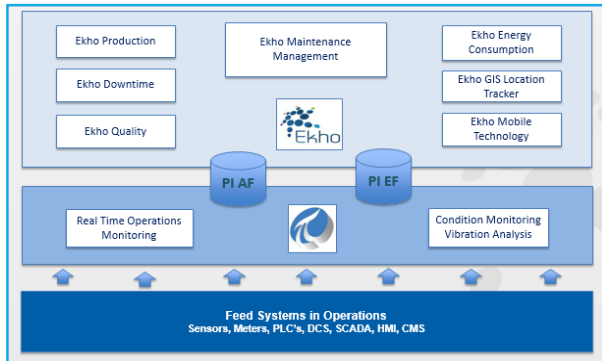
# Ekho Functionality Driven with PI System Data



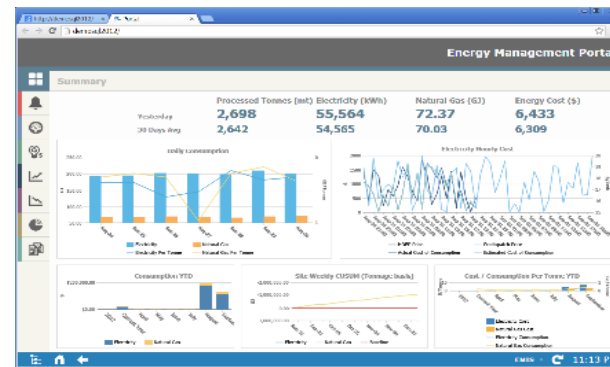
Centerlining



RCA



Maintenance

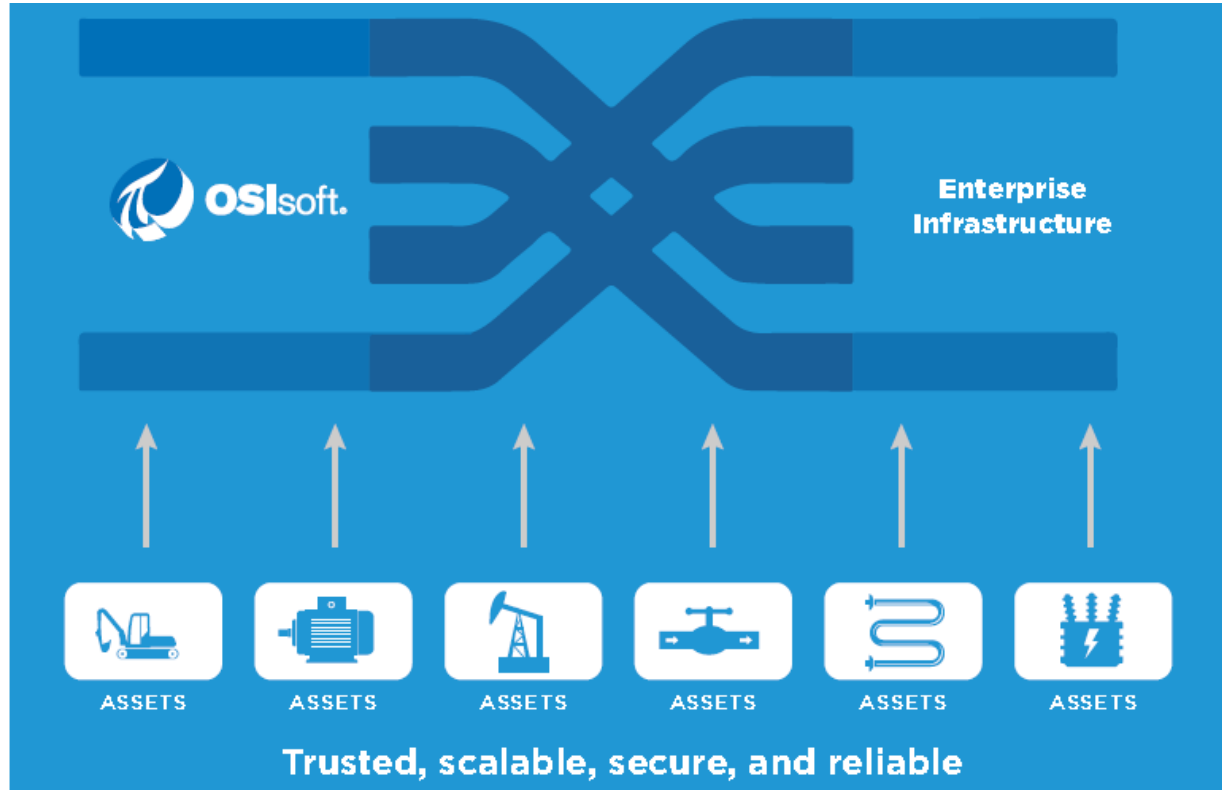


Energy



# Summary

# The PI System Infrastructure



# Summary Slide

## COMPANY and GOAL

Kruger operates 4 integrated Pulp & Paper mills and needed a systems for real time information, to drive performance improvement initiatives



## CHALLENGE

Gather production data in a complex environment

- 2 sites
- Complexity of the process
- Multiple systems to connect

## SOLUTION

Broaden the use of the PI Server to gather data

- PI Server
- PI ProcessBook
- Ekhsosoft

## RESULTS

Better view of downtime and quality data

- 5% of downtime reduction
- Better identification of impact of downtime in different part of the mill



# Contact Information

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Business Development Manager

Ekhosoft



## Questions

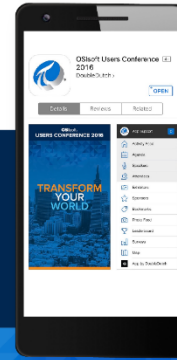
Please wait for the **microphone** before asking your questions



State your **name & company**

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谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

The last frontier for untapped profits ....

.... **Asset Performance Management**

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