Keeping Assets Healthy – PI System's Role in Asset Maintenance

Presented by **Gopal GopalKrishnan, P.E.**

Keith Pierce

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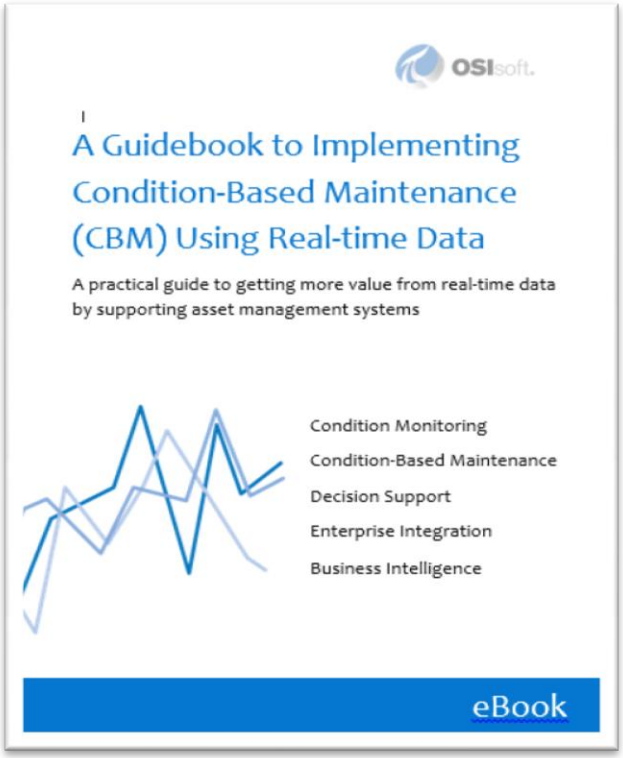
CBM Prescriptive Guidance



Terms & Definitions

Implementation Guidance

PI System Overview for CBM

PI System Integration w/ CMMS

Enabling Opportunities

Solution Examples

Industry References

Guidebook

http://pages.osisoft.com/CBM_Guidebook_LP.html

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Terms & Definitions

PM/CM

APR

Predictive

APM

RCM

CBM

Condition Based Maintenance

PF

CM

Condition Monitoring

RCA

CMMS

FMEA

http://pages.osisoft.com/CBM_Guidebook_LP.html

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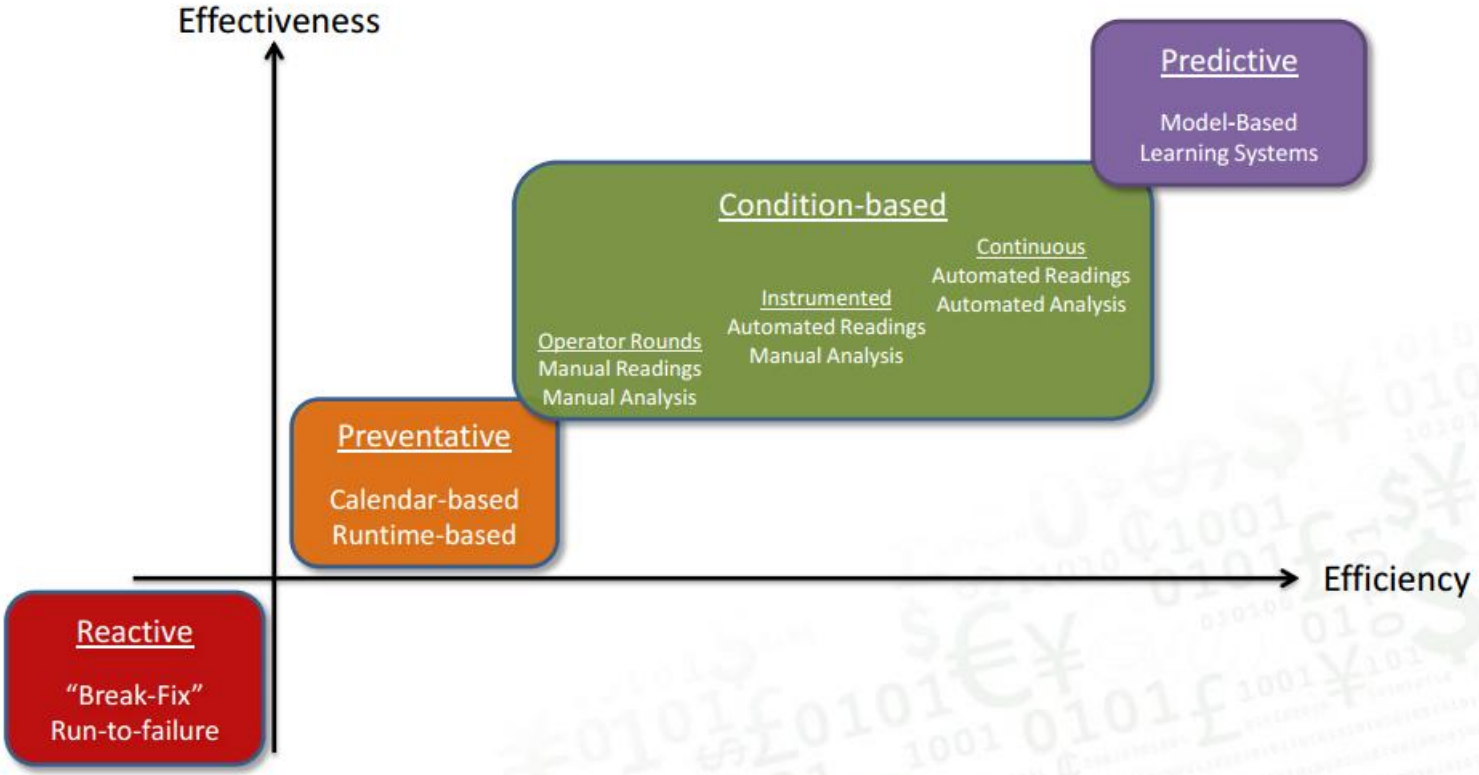
Condition Monitoring is an Effective Maintenance Strategy



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CBM means different things to different people

- Incipient Failure Detection
- Condition Monitoring
- Condition Assessment
- CBM Preventive Maintenance

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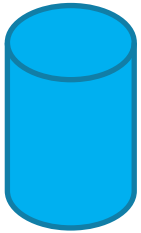
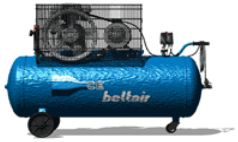
Operations

Data + Events

History



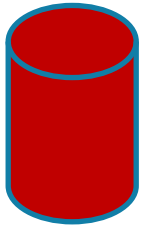
PI System



Maintenance

Data + Events

History



Maximo

SAP

ORACLE

INFOR

IFS

ABB

Mincom

Asset Suite

Passport

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Operations vs. Maintenance

- Pressure
- Flow
- Temperature
- Level
- …
- …

- Vibration
- Oil analysis
- Motor current
- Thermography
- …
- …

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PI System's role in Maintenance

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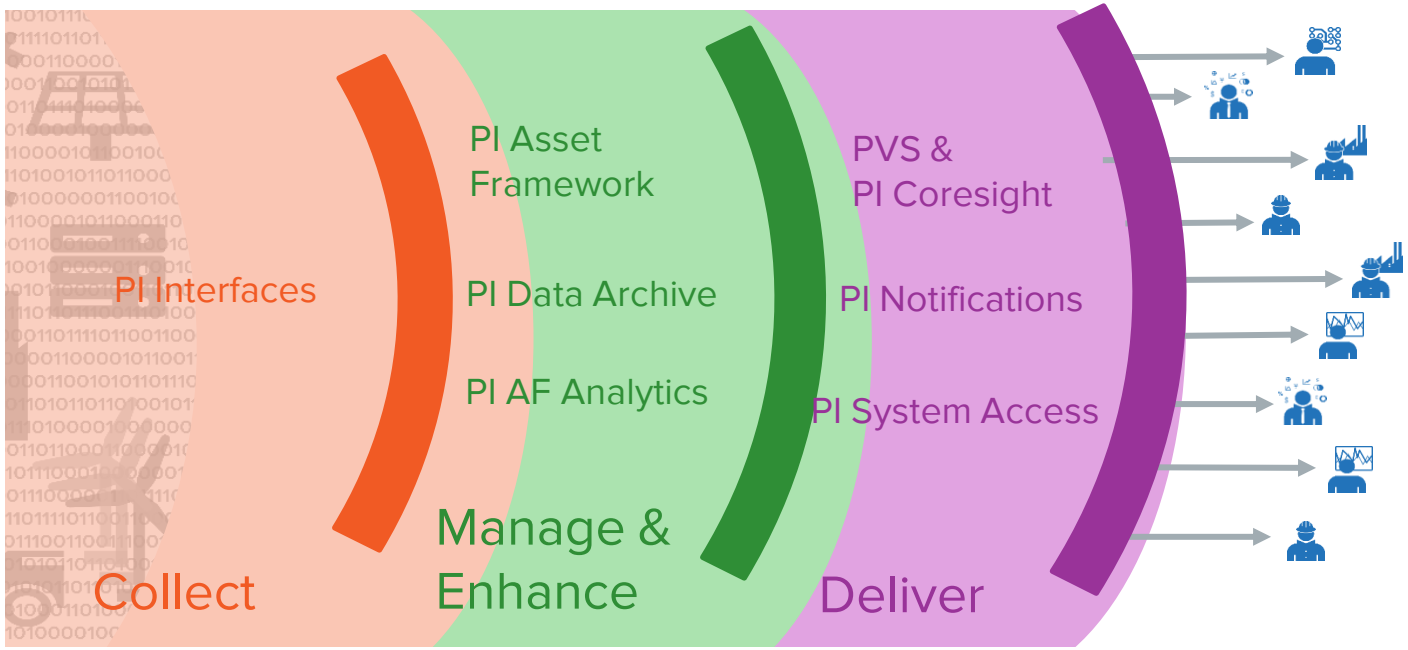
The 6 Steps of CBM with the PI System

1. Connect to relevant sources
2. Collect and archive data
3. Assign context (asset based)
4. Execute condition monitoring logic
5. Visualize real-time conditions
6. Alert & notify



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To Do List - Basic

- Create a watch list – early warning system
  - Equipment usage – run hours, tons processed, start/stop cycles…
  - Equipment condition alerts – filter clogged, heat-exchanger fouled, motor vibration high…
- Notify the asset owner – with links to details
- Create a report – across asset and production events

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To Do List - Advanced

- Asset health score
- Work management integration – it is not hard – SAP PM, Maximo, Oracle…
- Make it easy for Maintenance to see Operations (PI System) data

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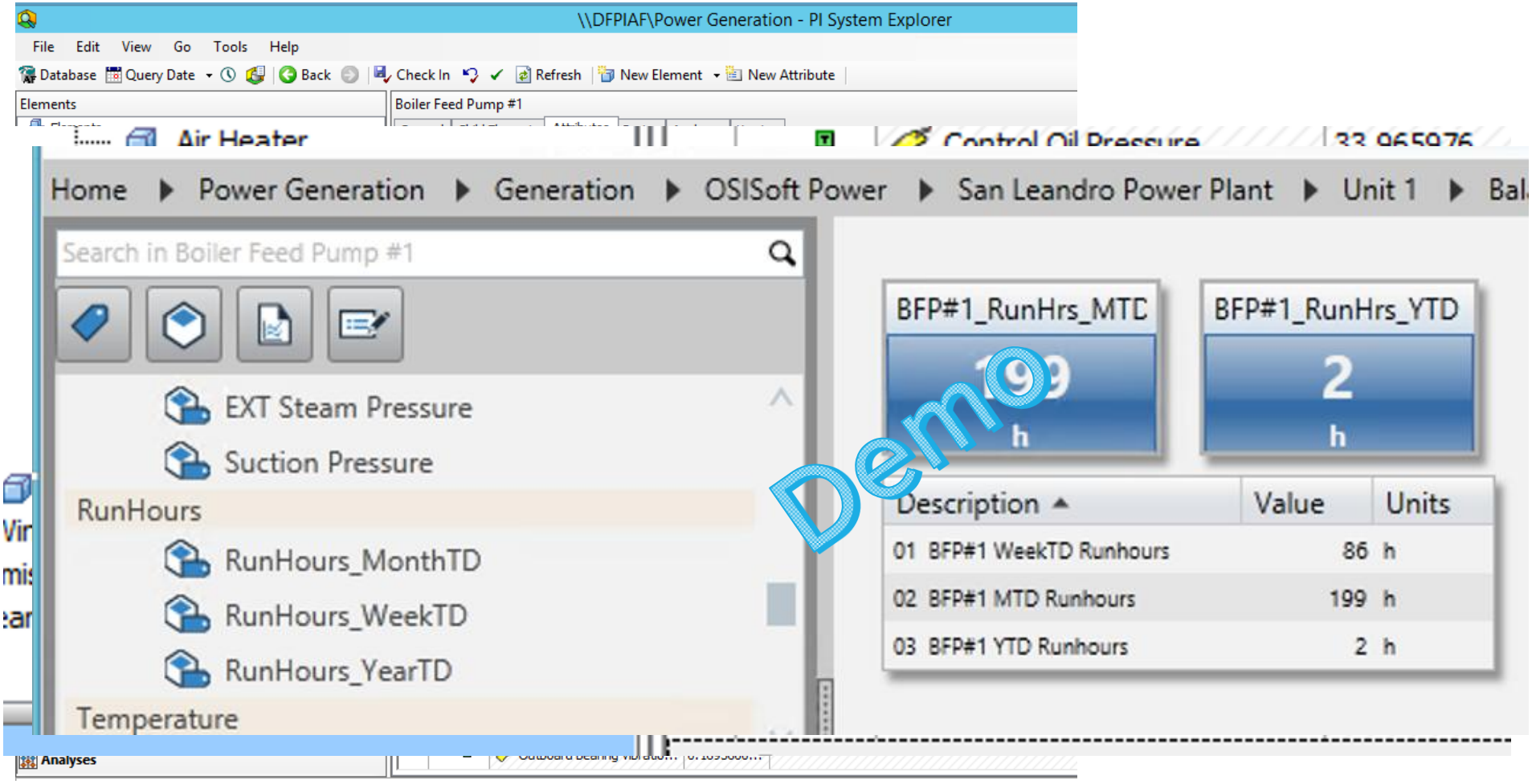

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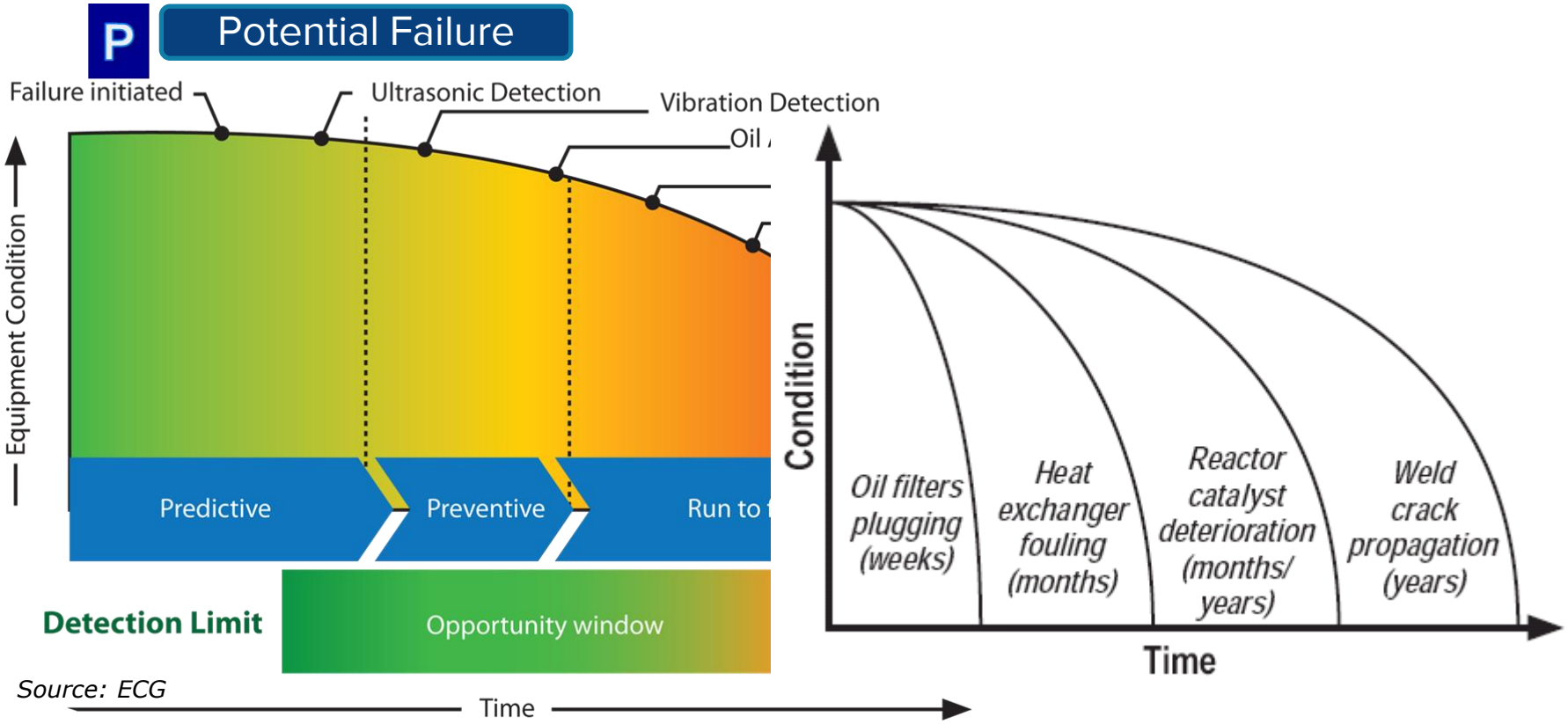
Incipient Failure Detection



Source: ECG

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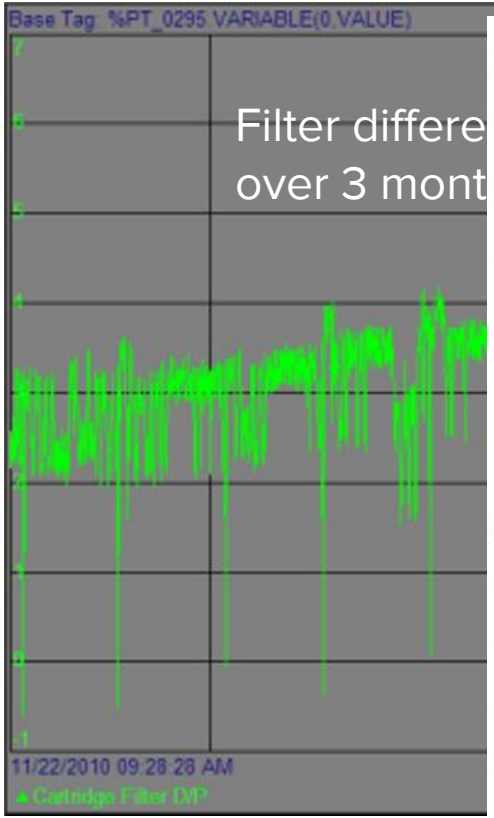
Filter clogging, Heat exchanger fouling…



Filter differe
over 3 mont

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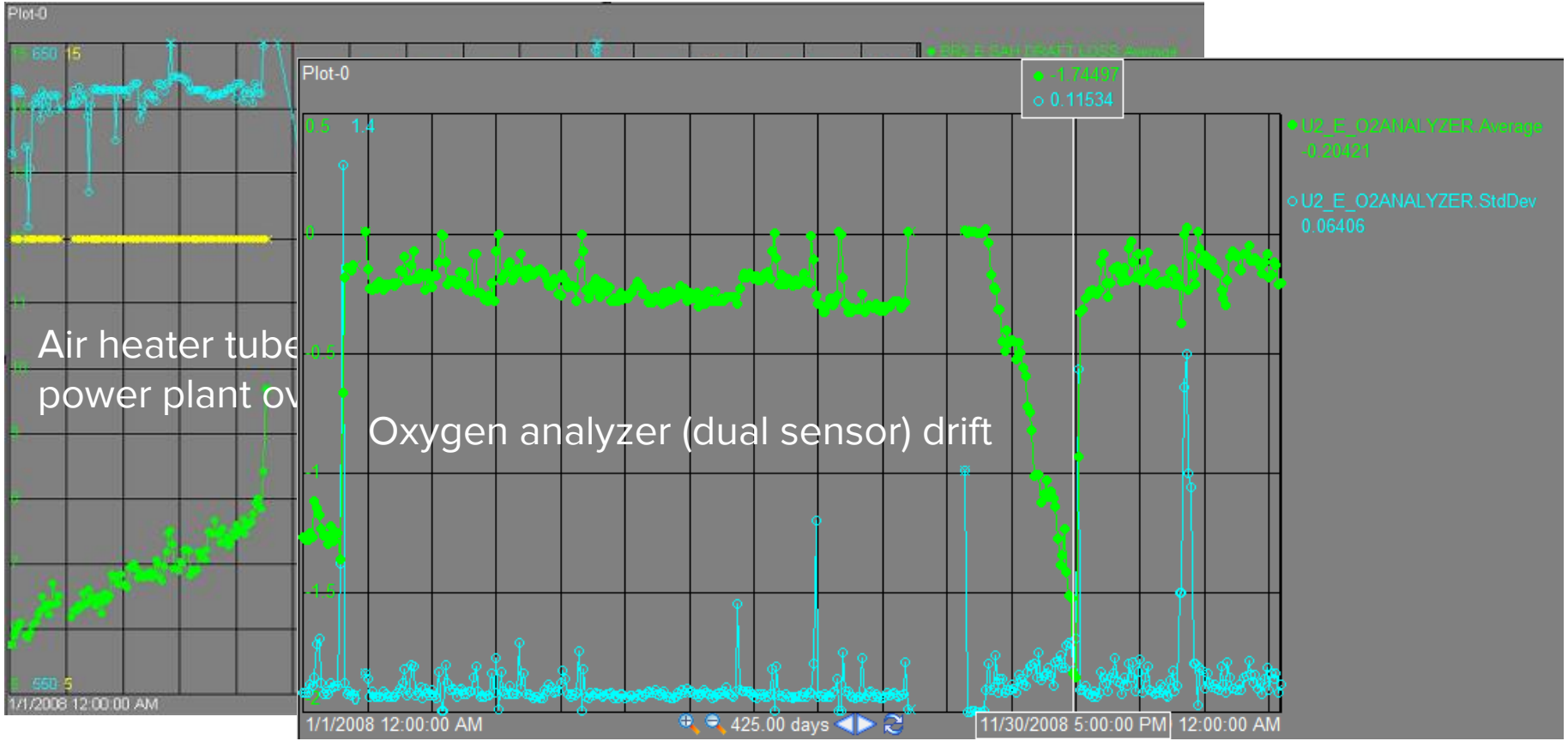
Air heater tubes plugging, Oxygen analyzer drift…



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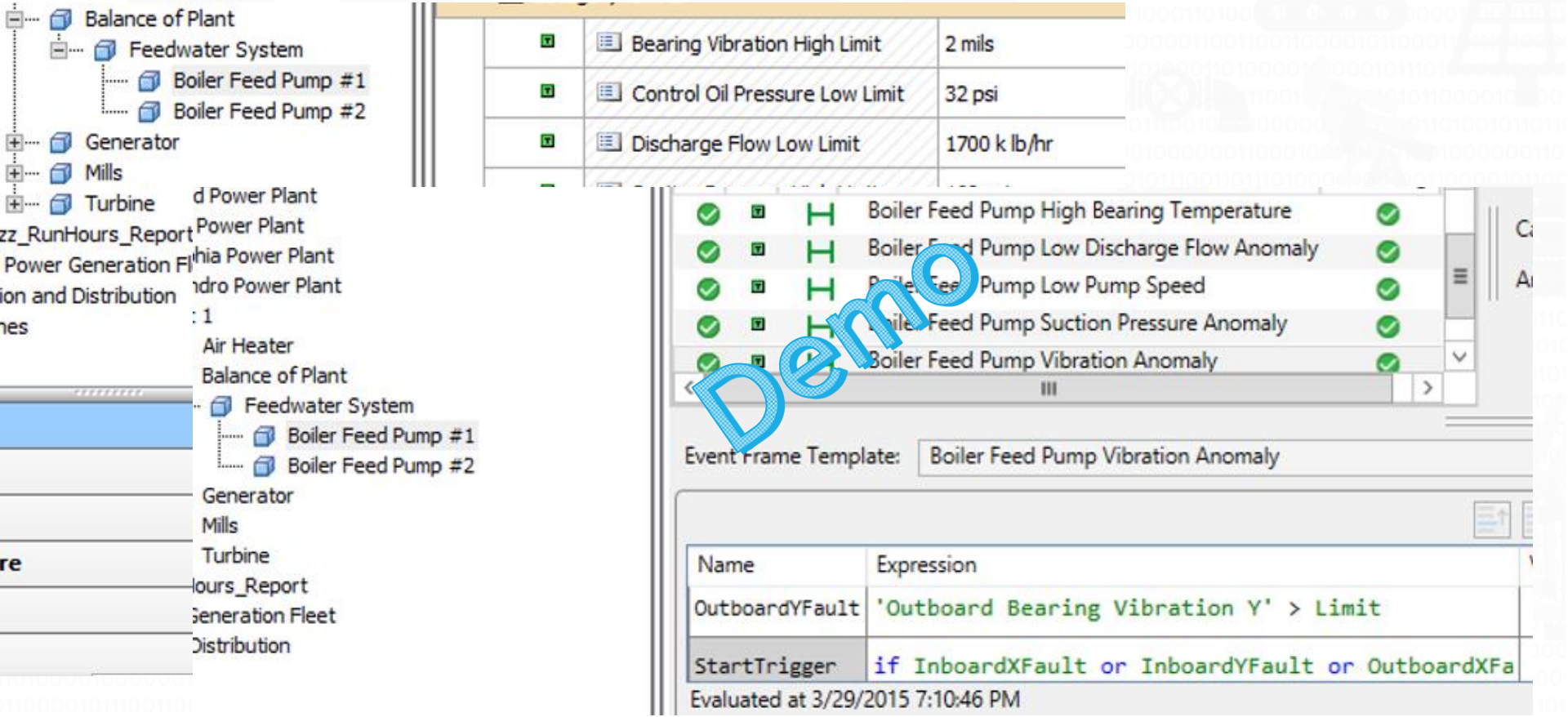
Motor vibration alert calculations



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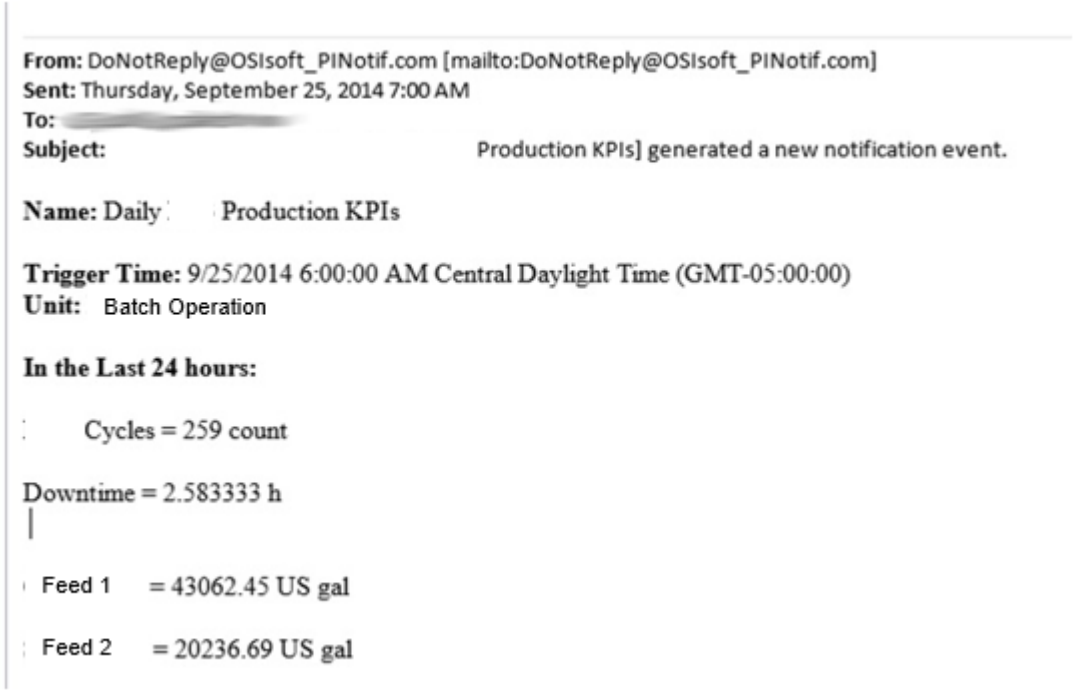
Notify asset owner – include links to displays



From: DoNotReply@OSIsoft_PINotif.com [mailto:DoNotReply@OSIsoft_PINotif.com]
Sent: Thursday, September 25, 2014 7:00 AM
To: [redacted]
Subject: Production KPIs] generated a new notification event.

Name: Daily Production KPIs

Trigger Time: 9/25/2014 6:00:00 AM Central Daylight Time (GMT-05:00:00)
Unit: Batch Operation

In the Last 24 hours:

Cycles = 259 count

Downtime = 2.583333 h

Feed 1 = 43062.45 US gal

Feed 2 = 20236.69 US gal

http://dfpicoresight/Coresight/#/PBDisplays/10073

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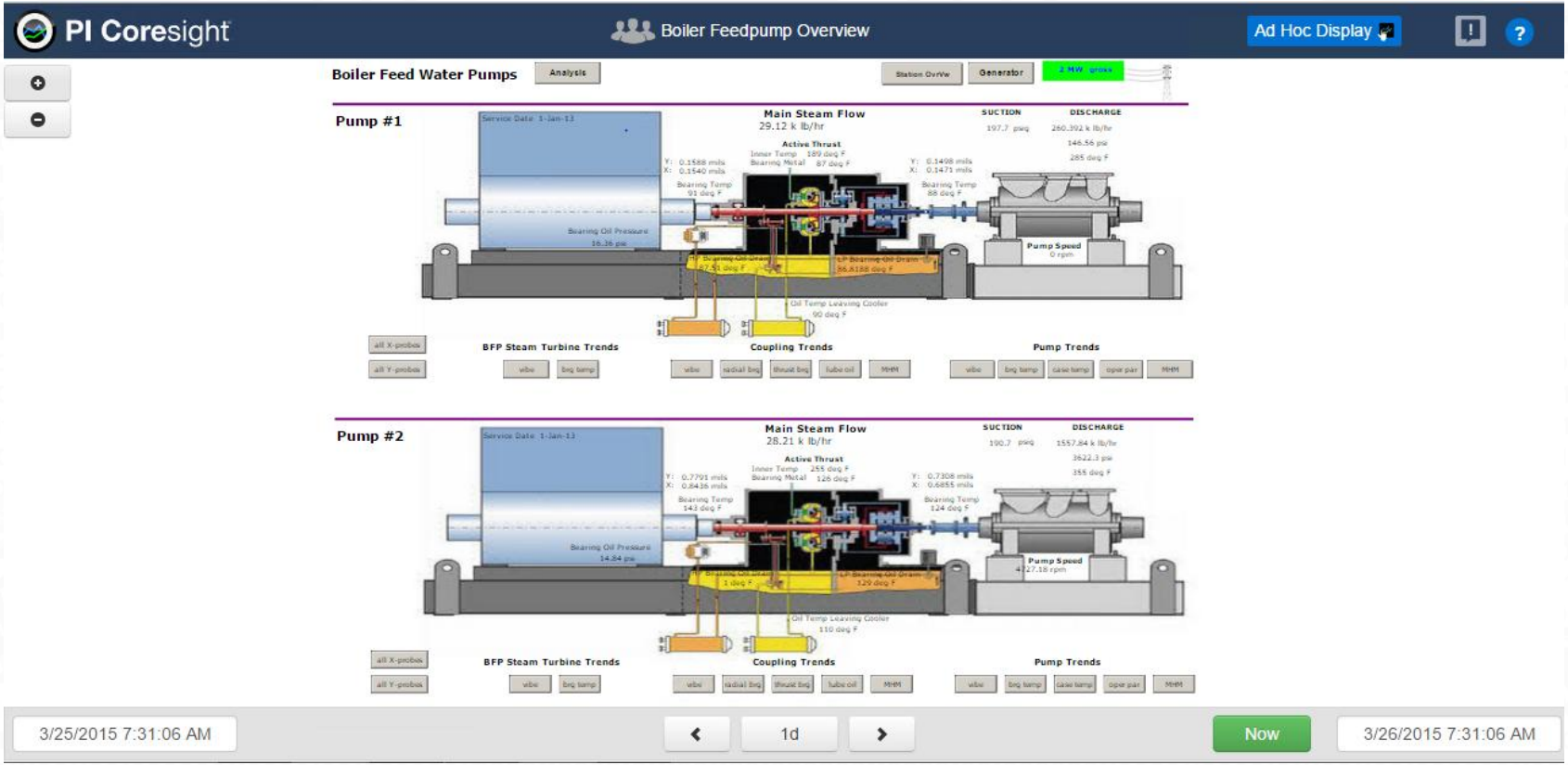
Linked PI System display from Notifications



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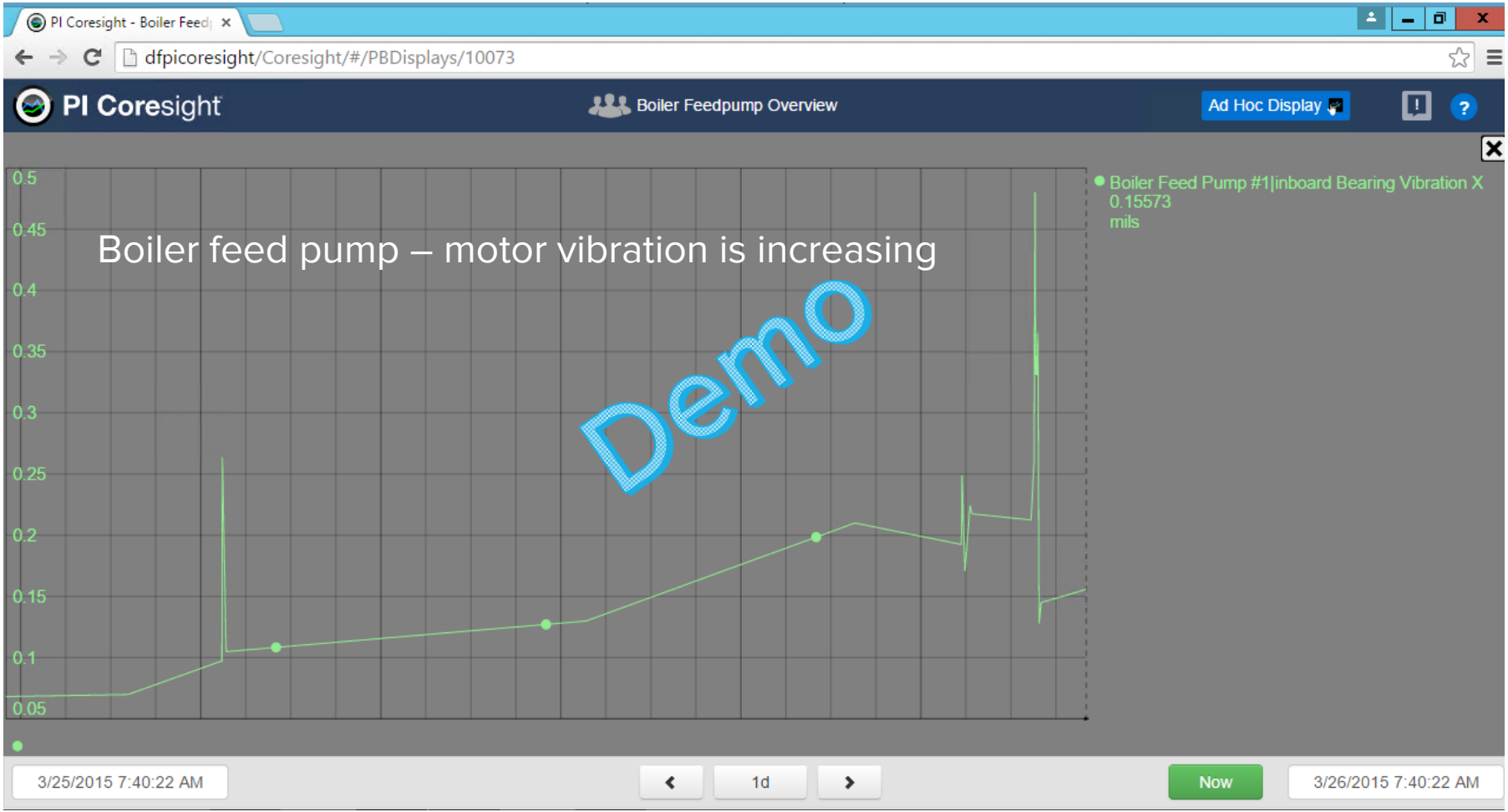

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Report across asset events

Select a DAY: 2015_01_13

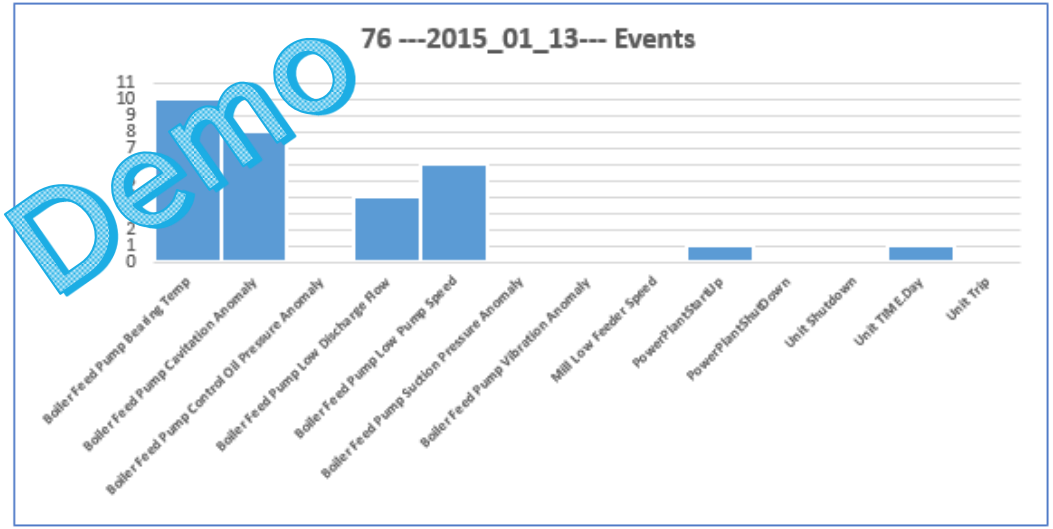
Search Start: 1/10/2015 (10-Jan-)
Search End: * (24-Mar-)

GENERAL INFORMATION	
DAY NAME	2015_01_13
Site	San Leandro Power Plant
Unit	Unit 1
Start Time	13-Jan-15 00:00:00
End Time	14-Jan-15 00:00:00
Duration	1 0:00:00
Duration (min)	1440.0
Day of Week	TUESDAY
Day Type	WEEKDAY
Element Path	\\DFPIAF\Power Generation\Generation\OSISoft Power\San Leandro Power Plant\Unit 1

AMBIENT TEMPERATURE	
Ambient Temperature.Min	36.23
Ambient Temperature.Avg	38.02
Ambient Temperature.Max	40.44

TURBINE OVERVIEW	
HP Overall Efficiency.Avg	0.00
IP Overall Efficiency.Avg	0.00

(76) Events during DAY ---2015_01_13--- on <<Unit 1>>



EF Name

Boiler Feed Pump Relative | Production Summary Report | Hourly Report | Daily Anomaly Investigation | GLOBAL | DAY Data

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To Do List - Advanced

- Asset health score
- Work management integration – it is not hard – SAP PM, Maximo, Oracle…
- Make it easy for Maintenance to see Operations (PI System) data

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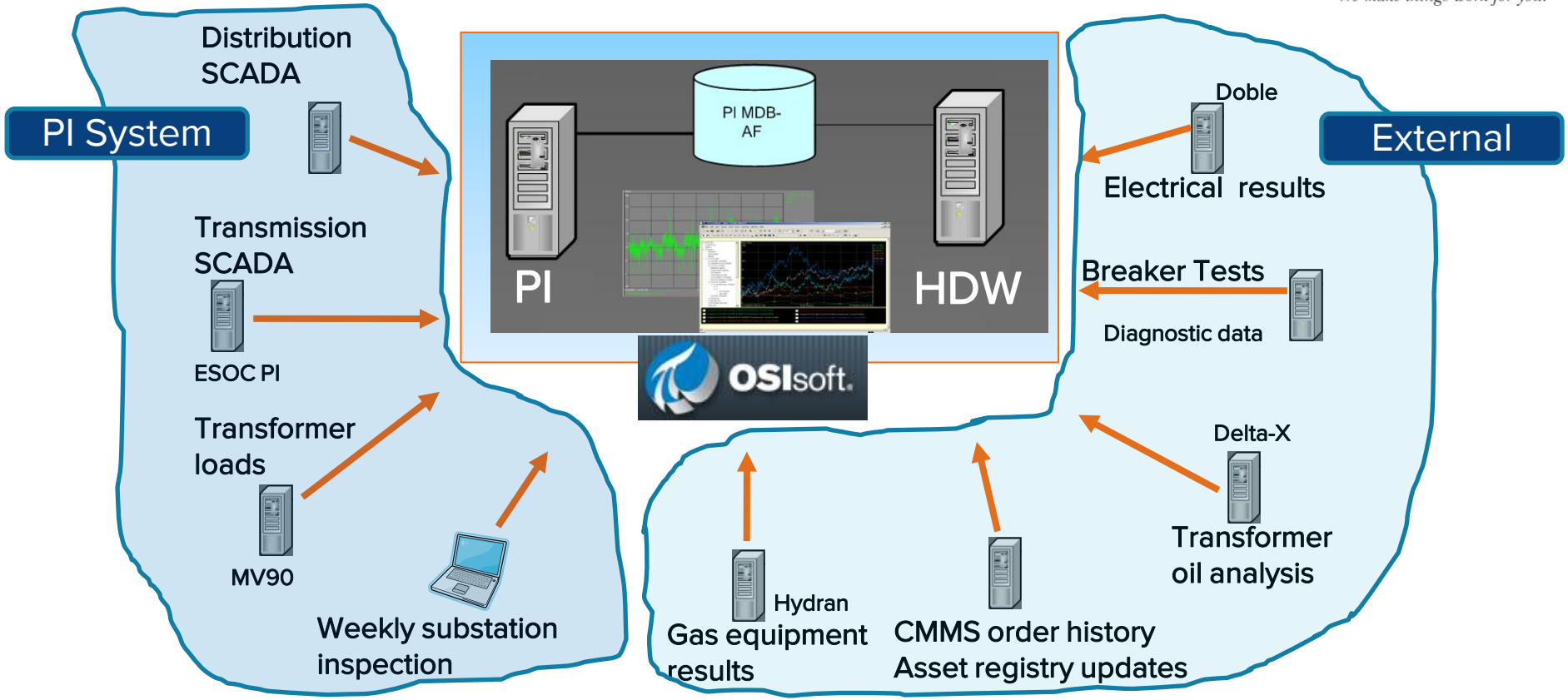
CBM data sources (T&D example)

PSE&G
We make things work for you.



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Asset health score

PSEG
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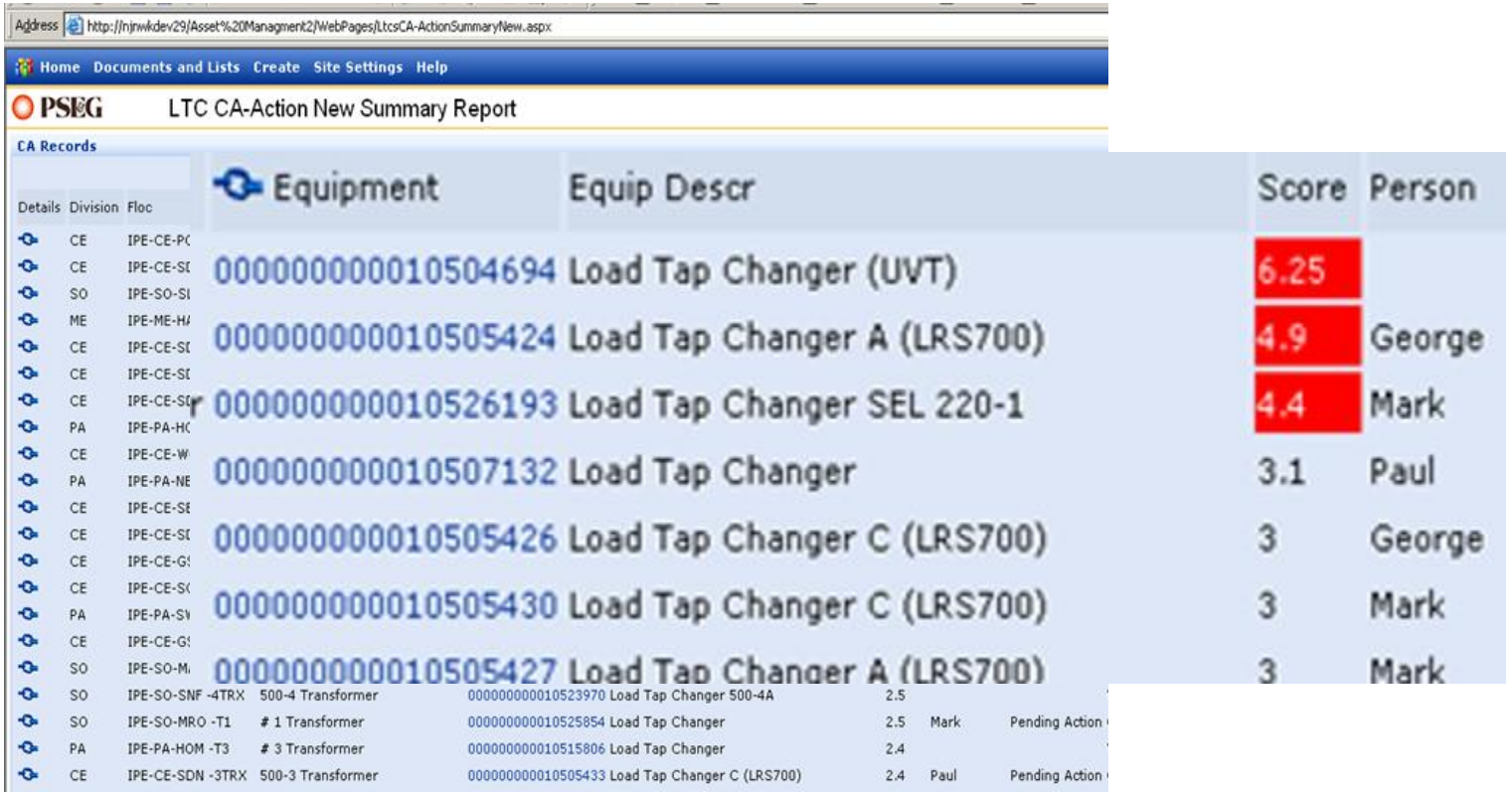

http://videostar.osisoft.com/Regional_Seminars/2009/Boston/Video/RS2009_Boston_CBM_PSEG_Gopal_Rothweiler.wmv

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Asset health score - details

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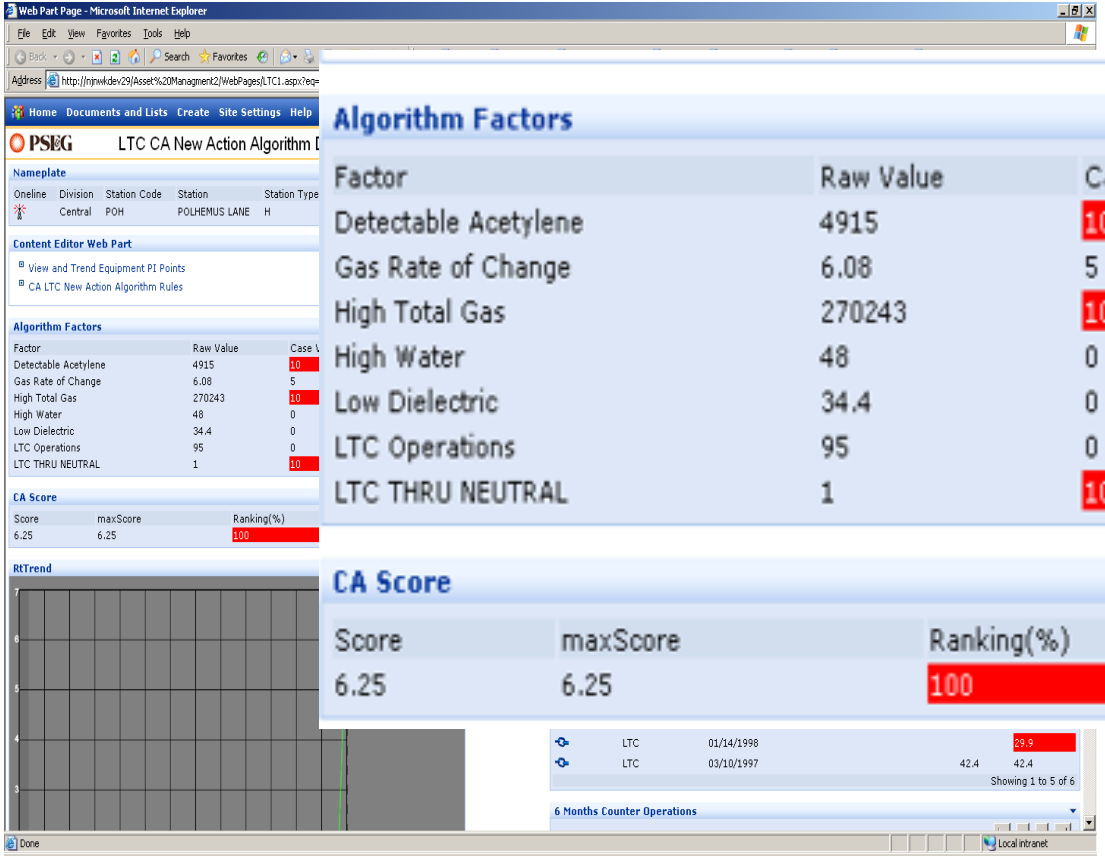

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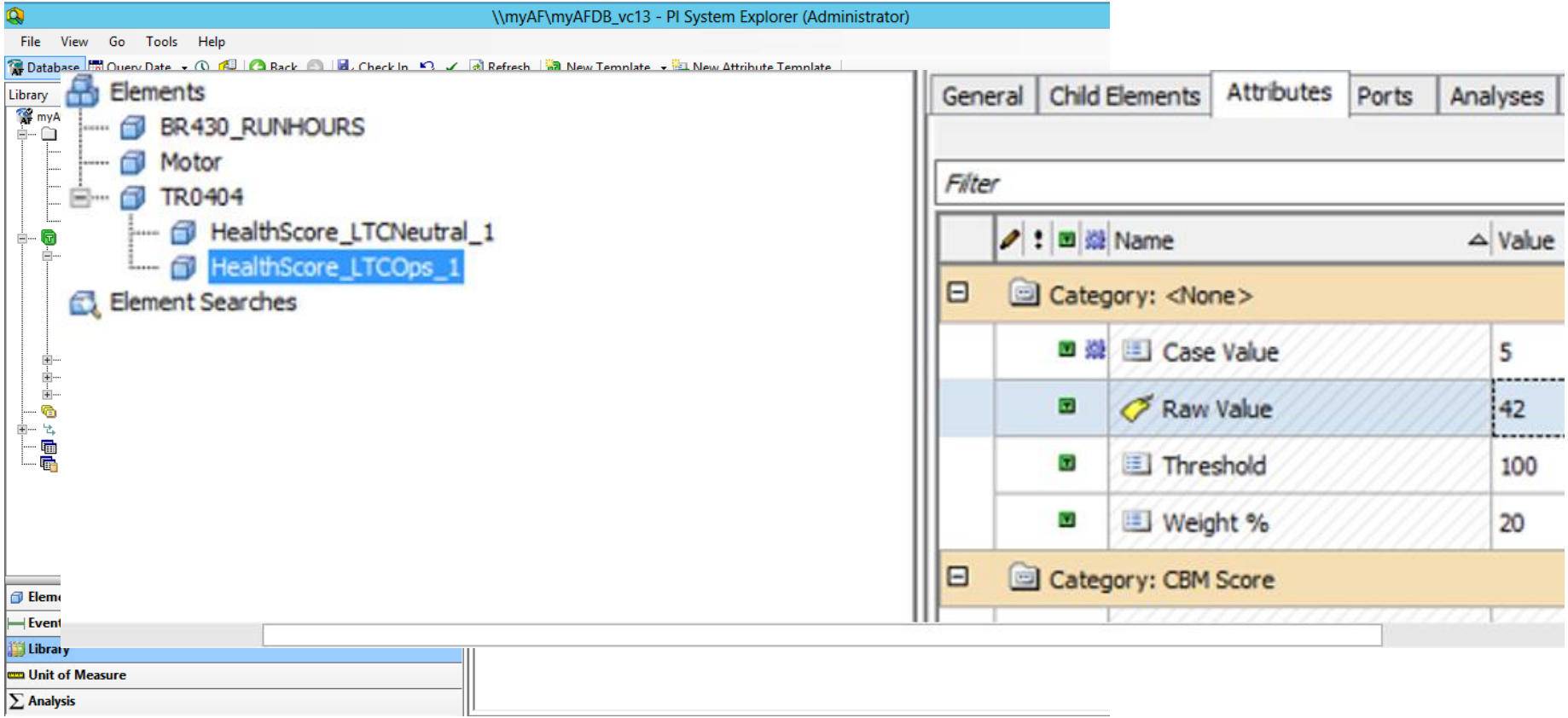
Asset health score - template



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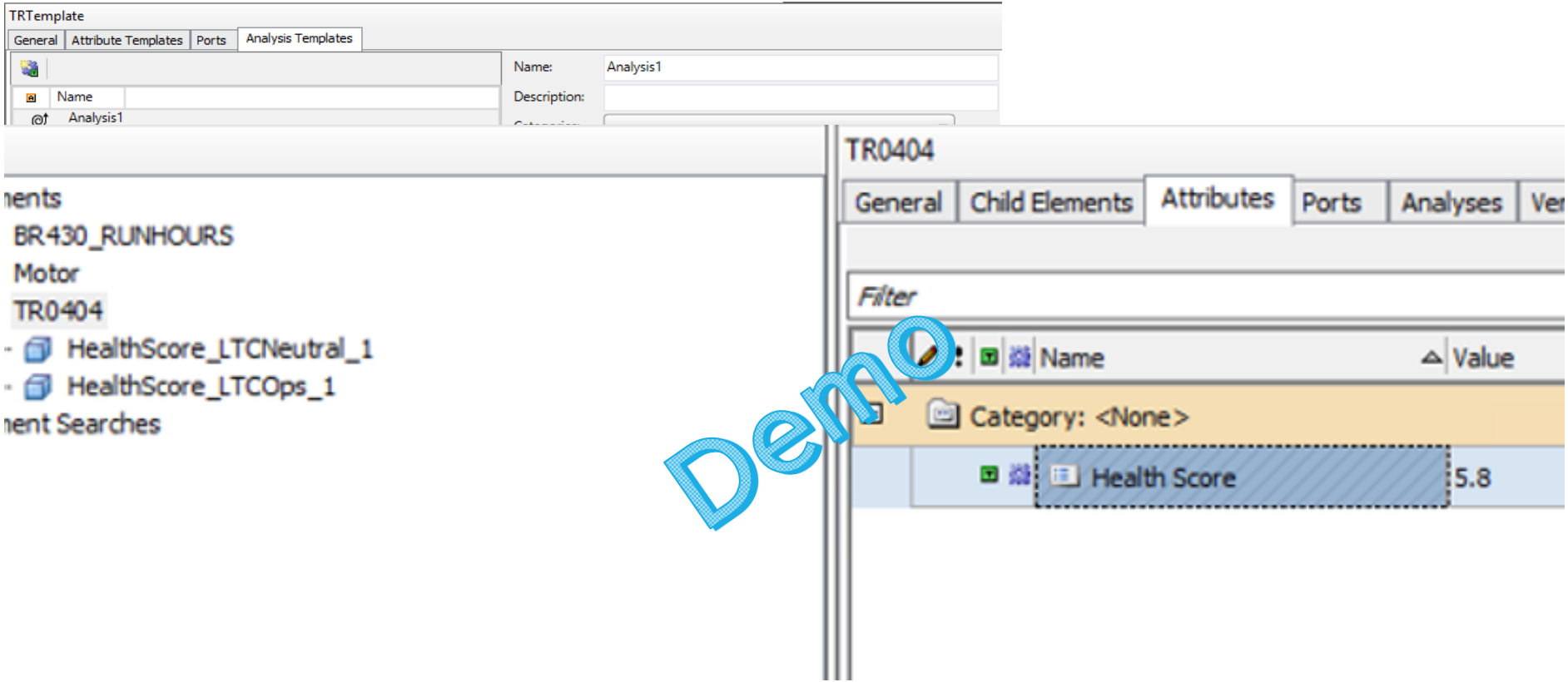
Asset health score – roll up calculations



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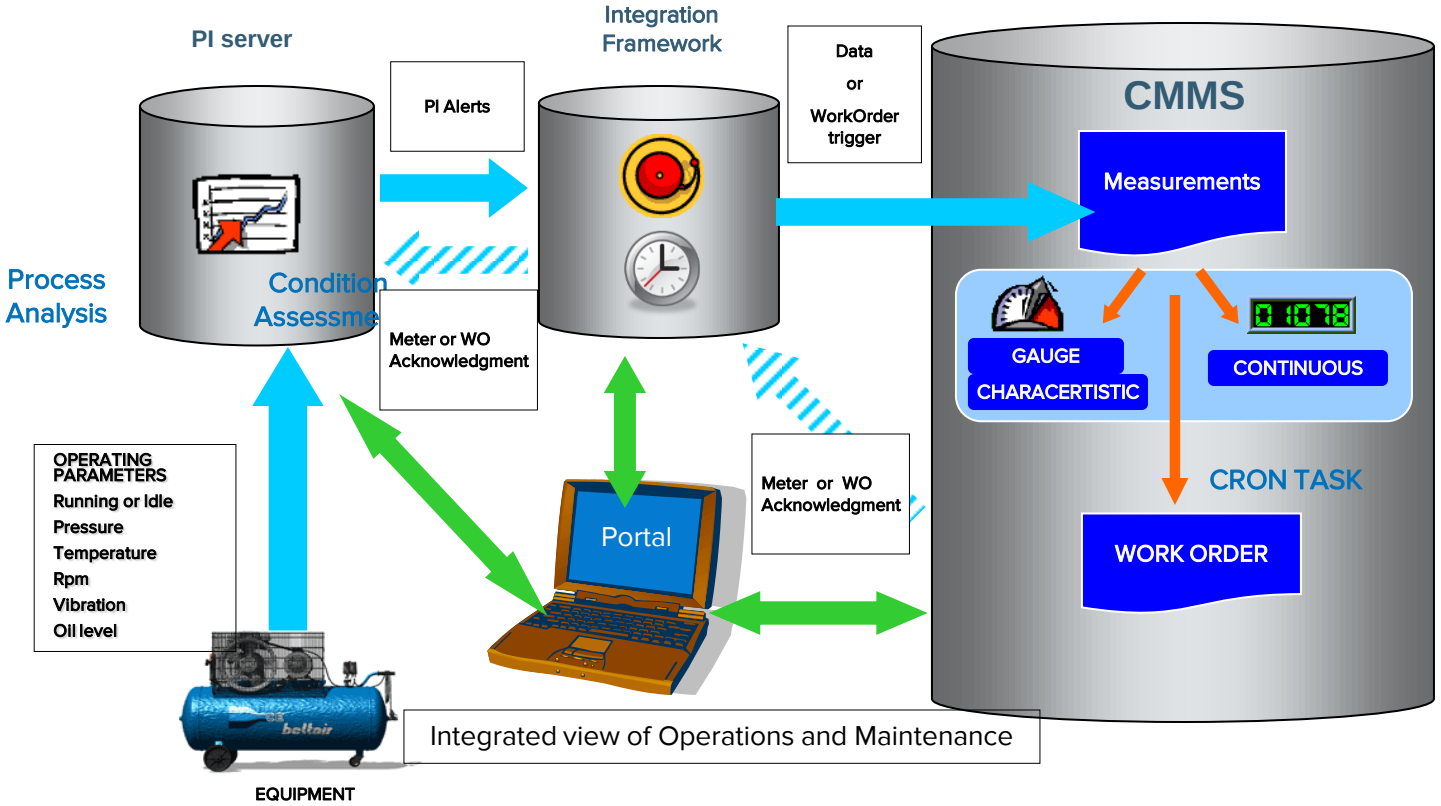
PI System to CMMS data flow



SAP

IBM

ORACLE

INFOR

IFS

ABB

Mincom

Asset Suite

Passport

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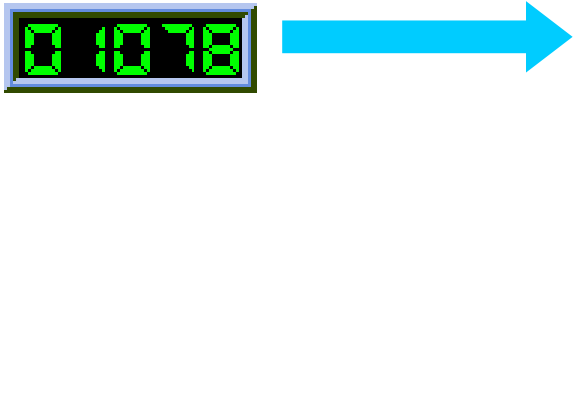
Send runhours from PI to SAP counter



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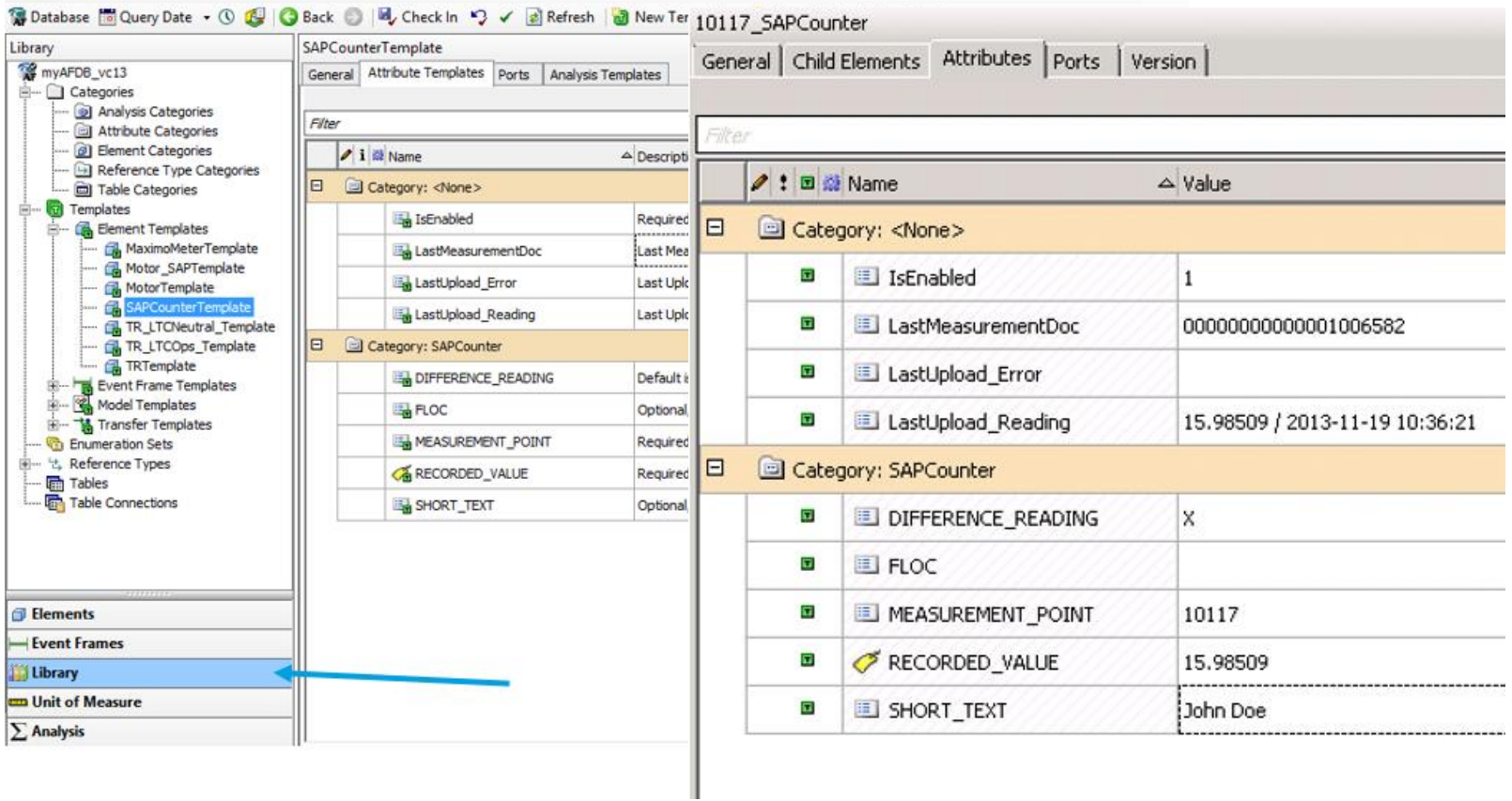
Template for SAP integration



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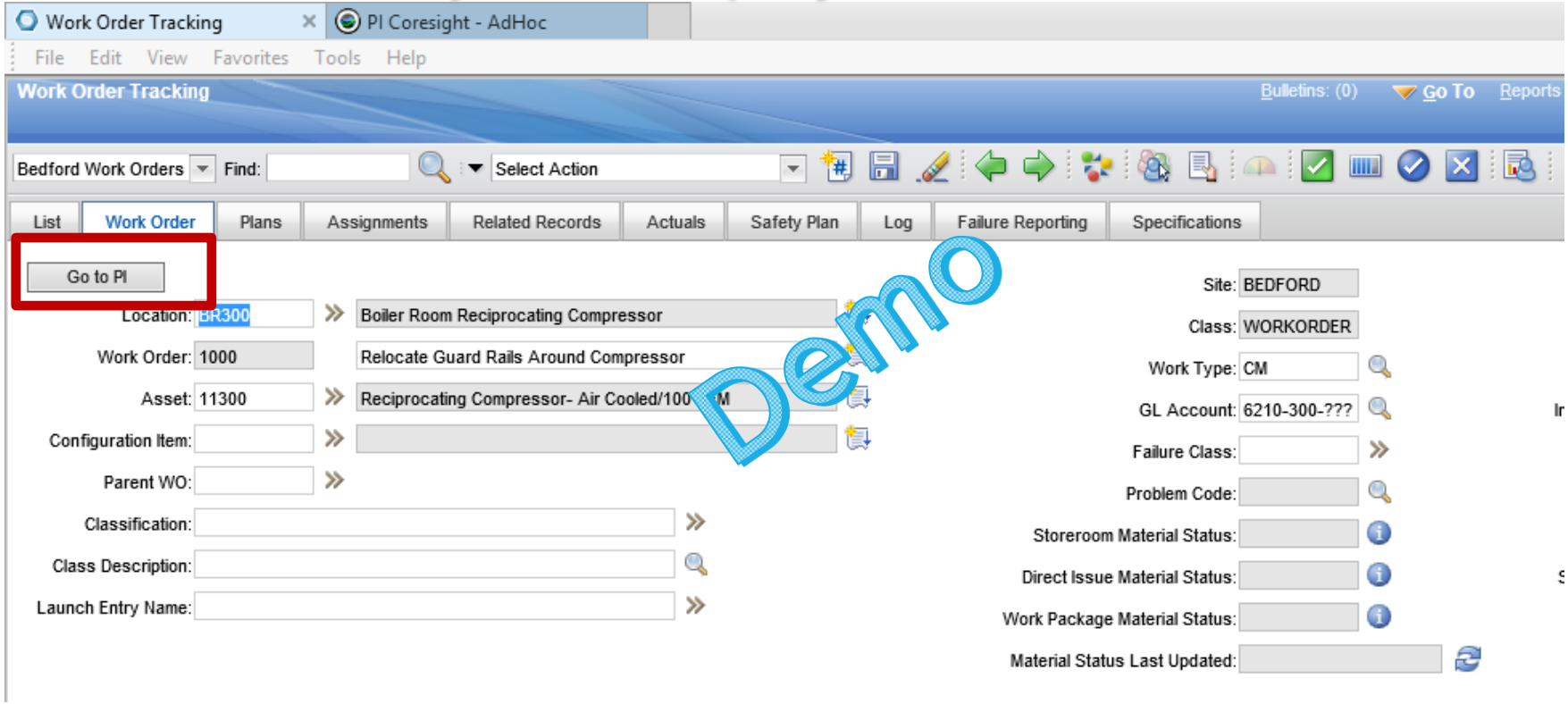
Linked PI System display from Maximo



http://pisb:8079/coresight/#/Displays/adhoc?DataItems=\\myAF\mafdb\11300&StartTime=*-30d&EndTime=*

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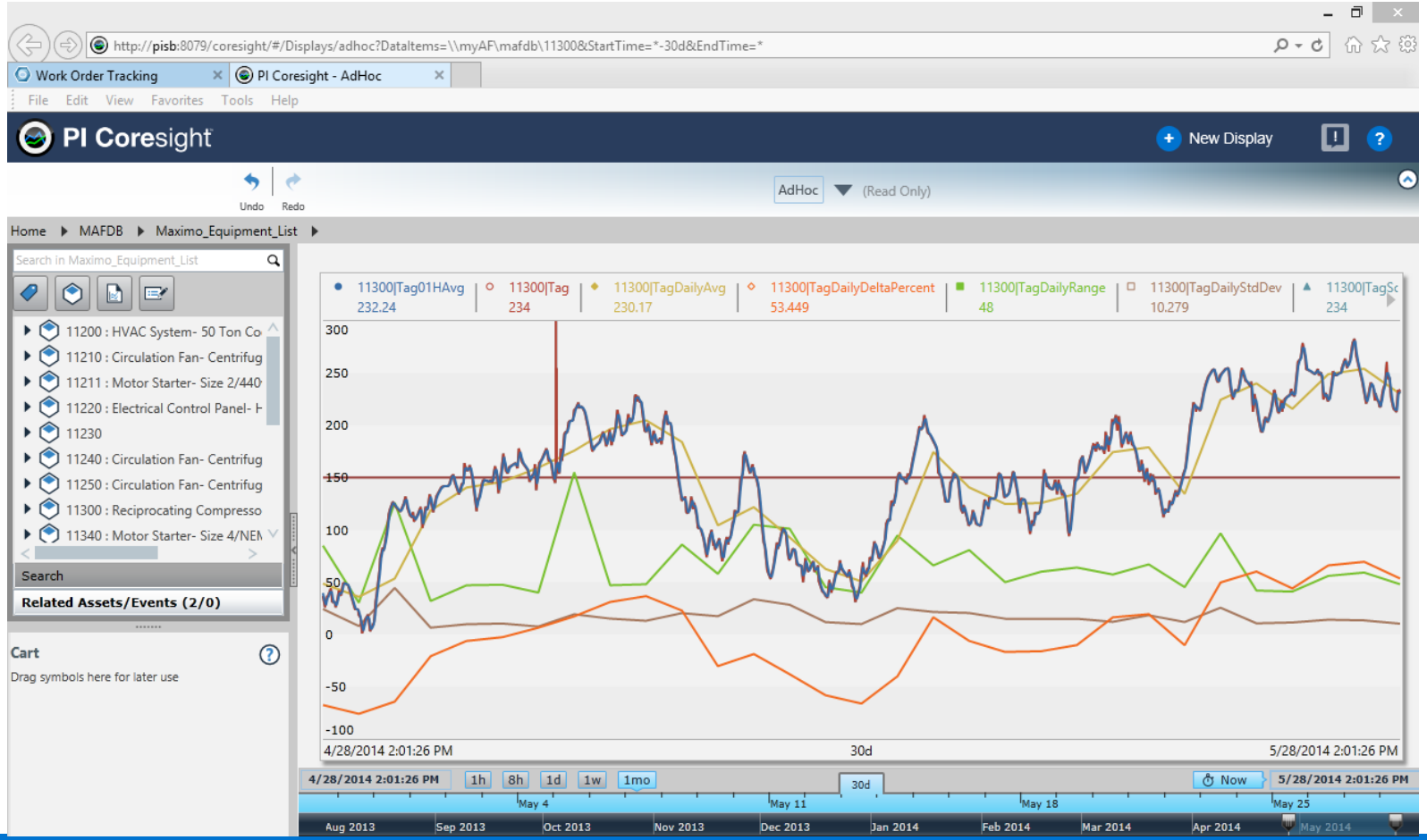
http://pisb:8079/coresight/#/Displays/adhoc?DataItems=\\myAF\mafdb\11300&StartTime=*-30d&EndTime=*



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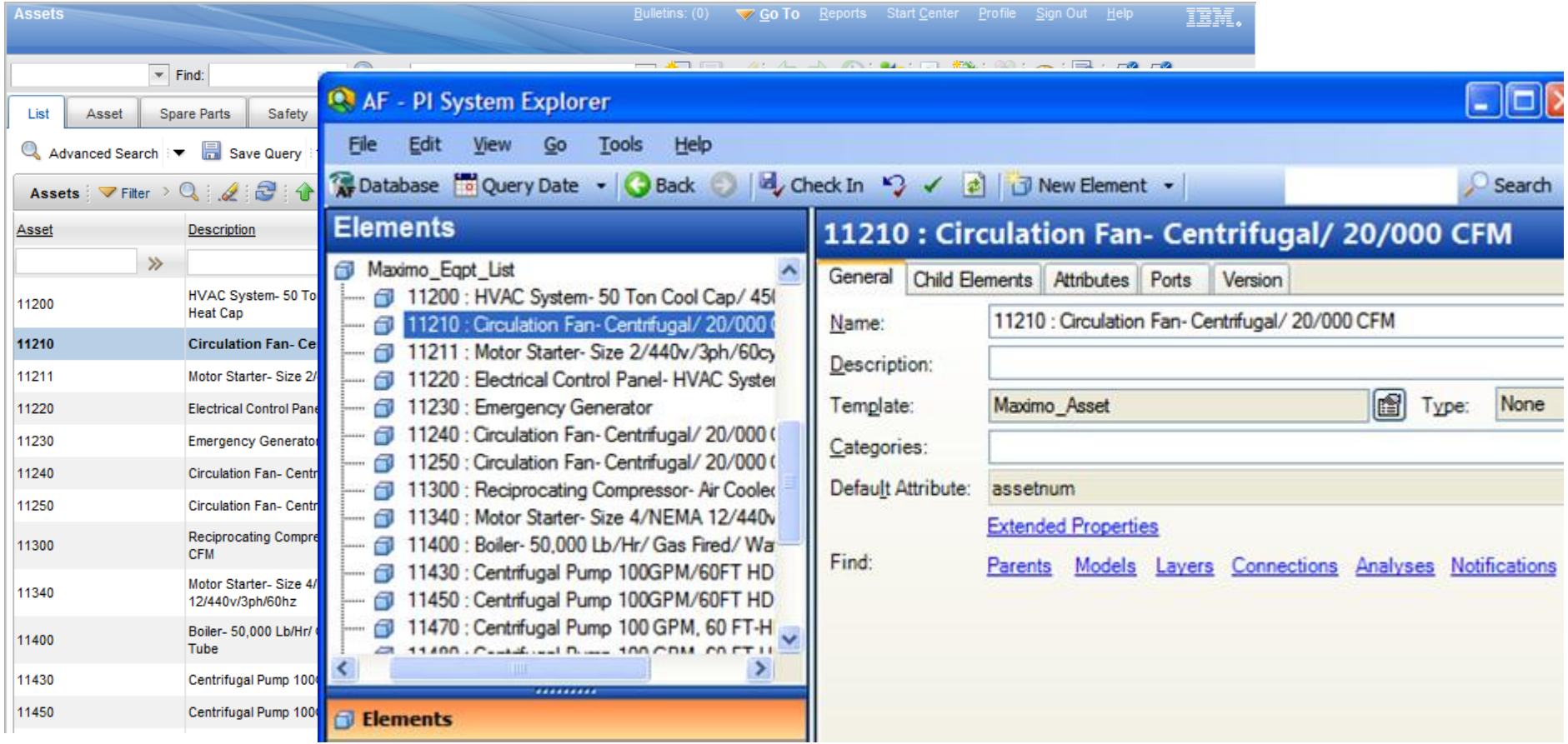
Shared Asset Names



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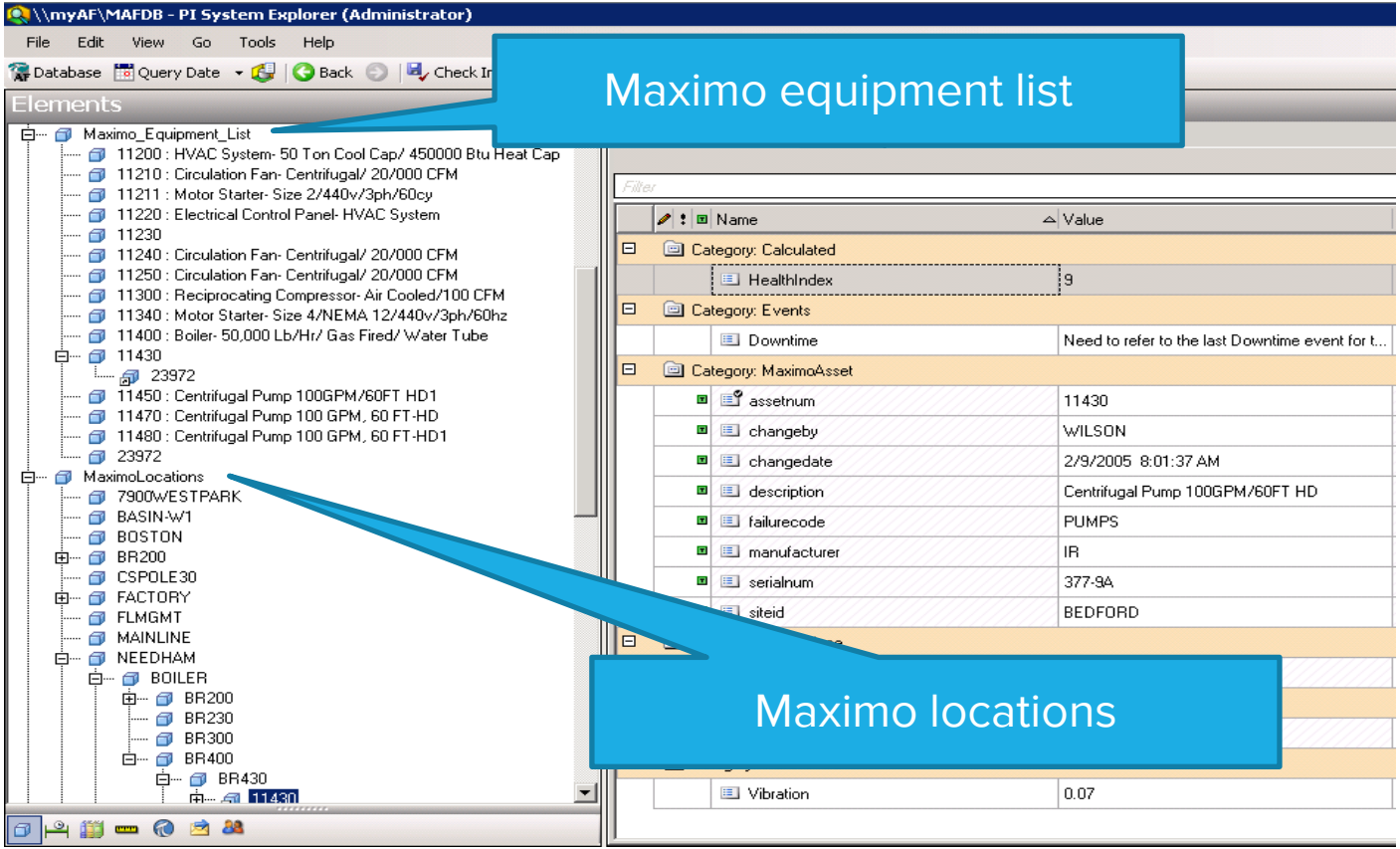
Maximo asset hierarchy in Asset Framework



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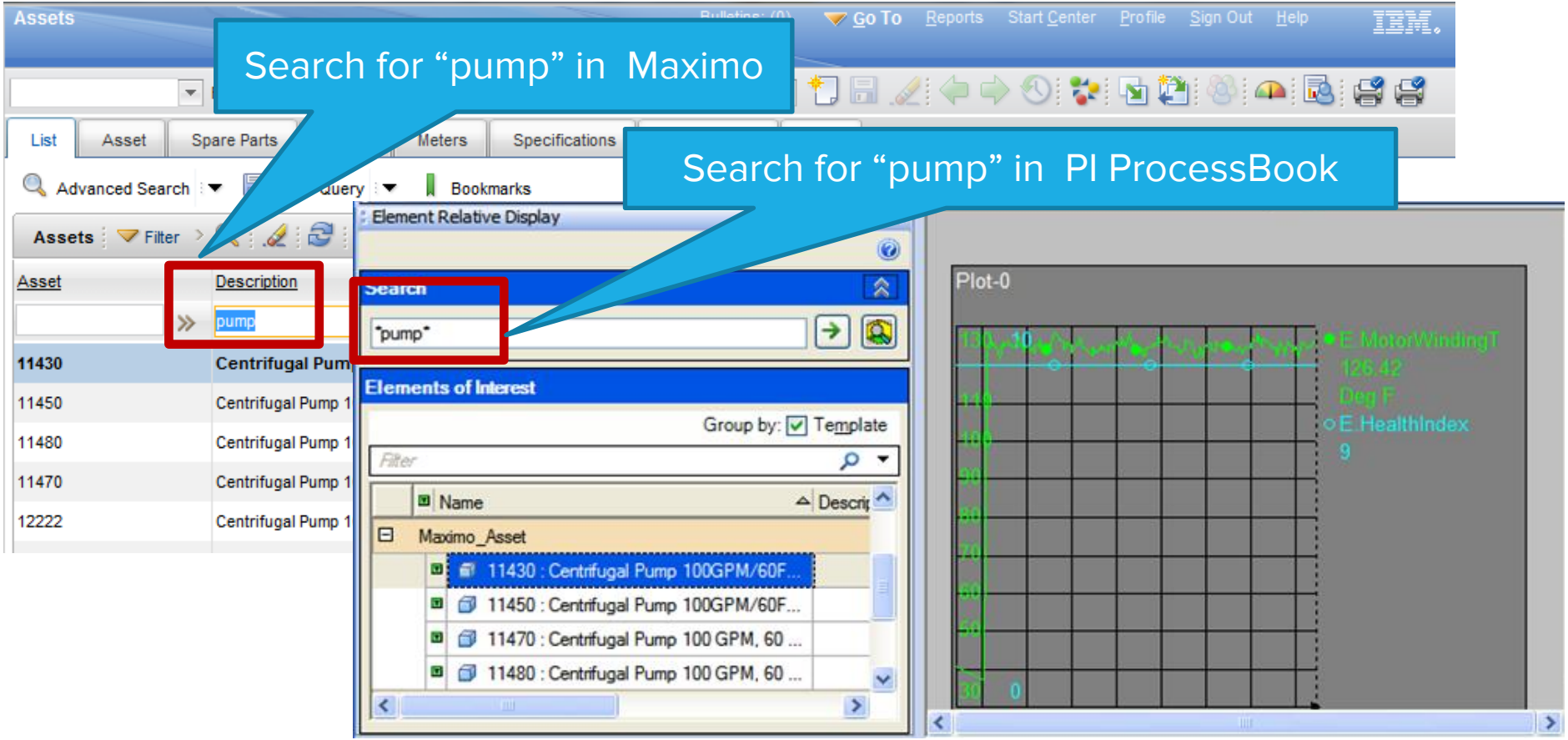

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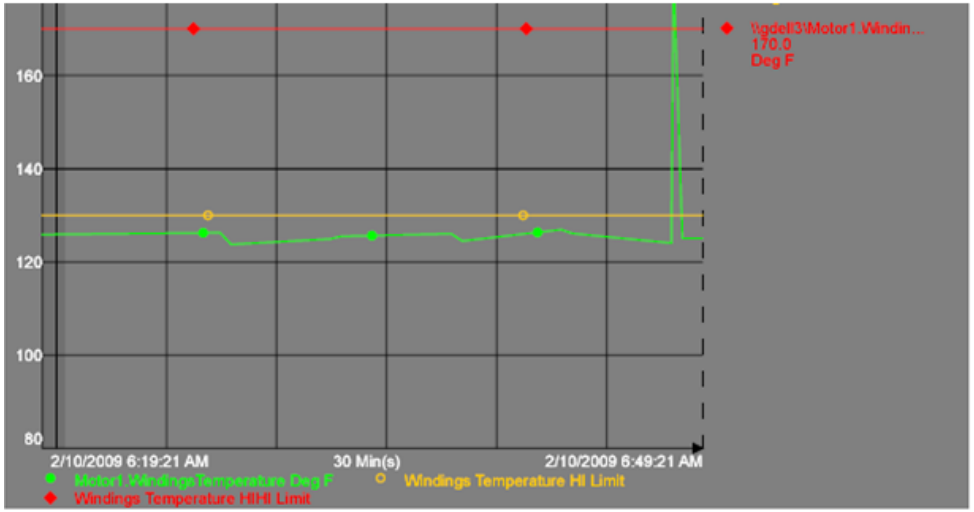

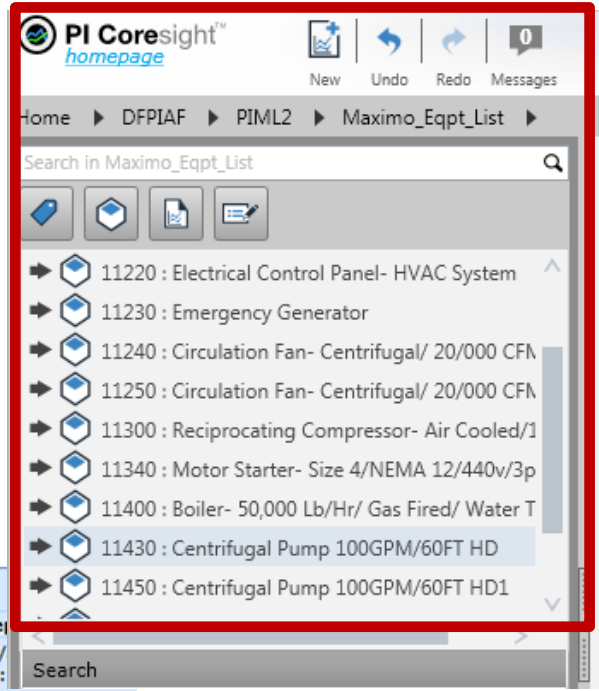

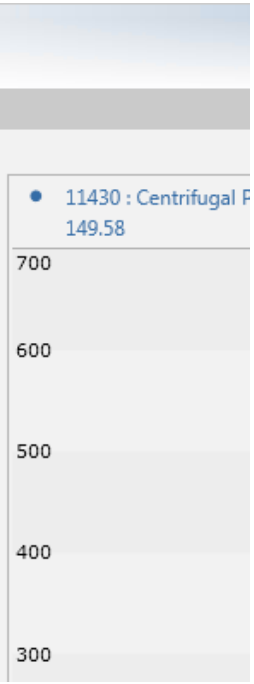

Maximo Work Orders

Equipment	WoNum	PM	Description	Status	StatusDate	Location	ReportedBy	Re
11430	1668		HiTempAlert	COMP	12/8/2008 10:22:18 AM	BR430	WILSON	12/ 10:
11430	1666		HiTempAlert	COMP	11/21/2008 10:21:53 AM	BR430	WILSON	11/21/2008 10:21:53 AM
11430	T1573		Check pump operation.	WSCH	5/2/2008 1:33:34 PM	BR430	MAXADMIN	5/2/2008 1:33:22 PM
11430	T1574		Check pump float switch.	WSCH	5/2/2008 1:33:34 PM	BR430	MAXADMIN	5/2/2008 1:33:23 PM
11430	T1575		Check seal and housing for leaks.	WSCH	5/2/2008 1:33:33 PM	BR430	MAXADMIN	5/2/2008 1:33:23 PM

Maximo Work Orders for “pump” 11430 in PI Web Parts

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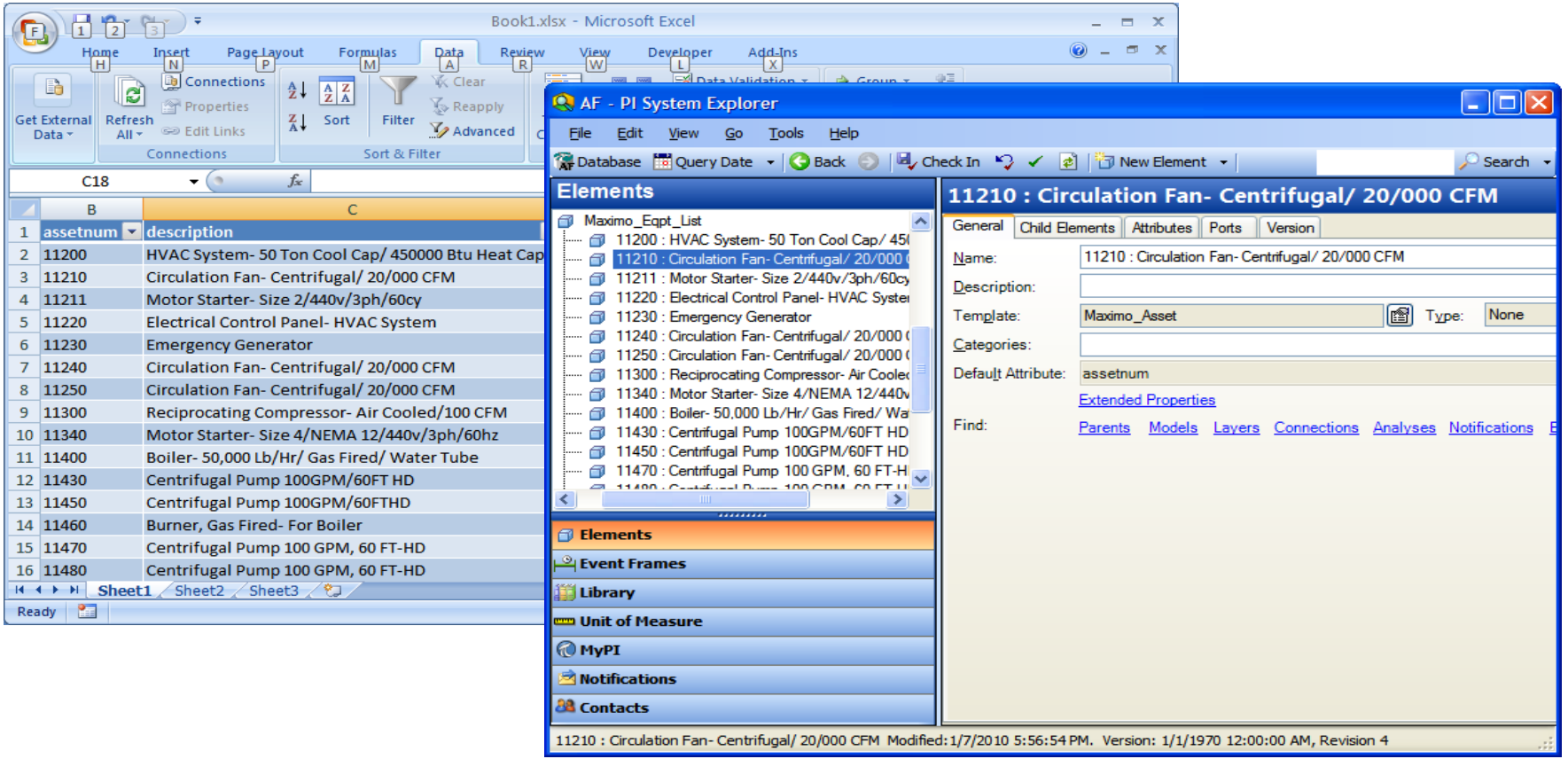
Maximo assets via PI Builder



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CBM related talks at this conference

Leveraging the PI System's Mobile Device Access and Visualization Capabilities to Enable CBM for Distribution Assets

Manila Electric Company

Industry Day – Power and T&D - 11:20 AM – 11:50 AM

Achieving Enterprise-wide Operational Intelligence using the PI Server's Asset Framework

SunCoke Energy

Industry Day - Metals and Mining – 3:40 PM – 4:10 PM

Leveraging the Enterprise Agreement to Maximize Value from the PI System Infrastructure One Solution at a Time

Evergreen Packaging

Industry Day – Paper and Pulp - 11:20 AM – 11:50 AM

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CBM Pod

- Tues: 12:30-5:30
- Wed: 9:00-7:00
- Thurs: 9:00-5:45
- Fri: 9:00-noon

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Questions

Please wait for the microphone before asking your questions

State your
name & company

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THANK YOU

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