The PI System: An Essential Pillar for MES and Operational Intelligence

Presented by Yashin Parsard

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- MES Team: Our Journey
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- Quick Wins with the PI System
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- Future Plans and Next Steps
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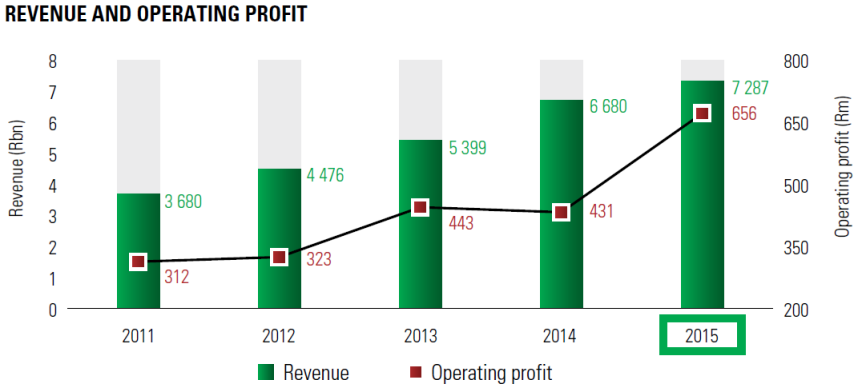
About Omnia

- Omnia's Agriculture division, Omnia Nutriology, is the market leader in Southern Africa and comprises Omnia Fertilizer and Omnia Specialities.
- The division produces granular, liquid and speciality fertilisers for a broad customer base.
- The main production facility is located in Sasolburg and consists of 12 plants.

2015 Operating profit
R656m
52% INCREASE

2015 Revenue
R7.29bn
9% INCREASE



Omnia Agriculture Results FY2015

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MES Team: Our Journey

June
MES Team Started
Team Size = 1
No Infrastructure or software.

Rest of 2012
Interface to Environmental Systems

Difficulties in interfacing to DCS

May
6 Month PI System Trial
Interface to Delta V and ABB.

Dec
Purchase and install PI System 2012, Hardware and Software

Interface to Lab System

Jan
MS SharePoint 2010 Installed

Nov
Team Size = 2

Dec
Team Size = 3

Feb
Team Size = 4

Apr
Adopt LabWare System

Aug
Upgrade to PI System 2015

2012 2013 2014 2015

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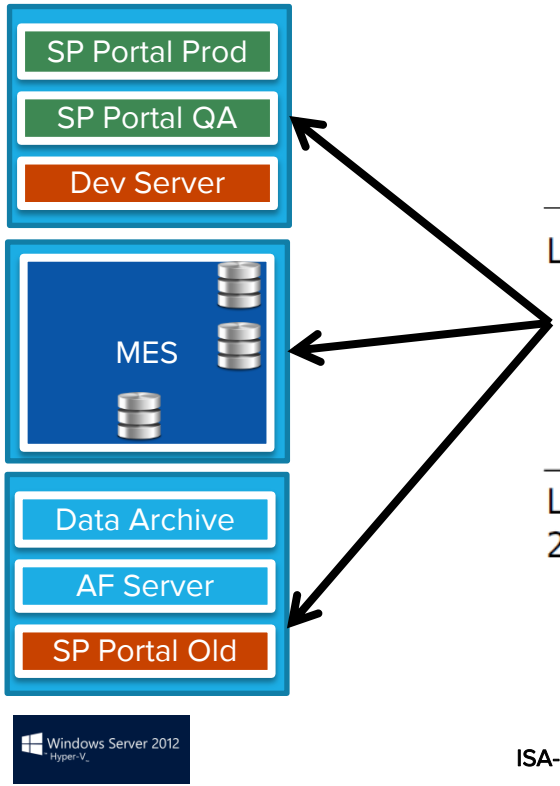
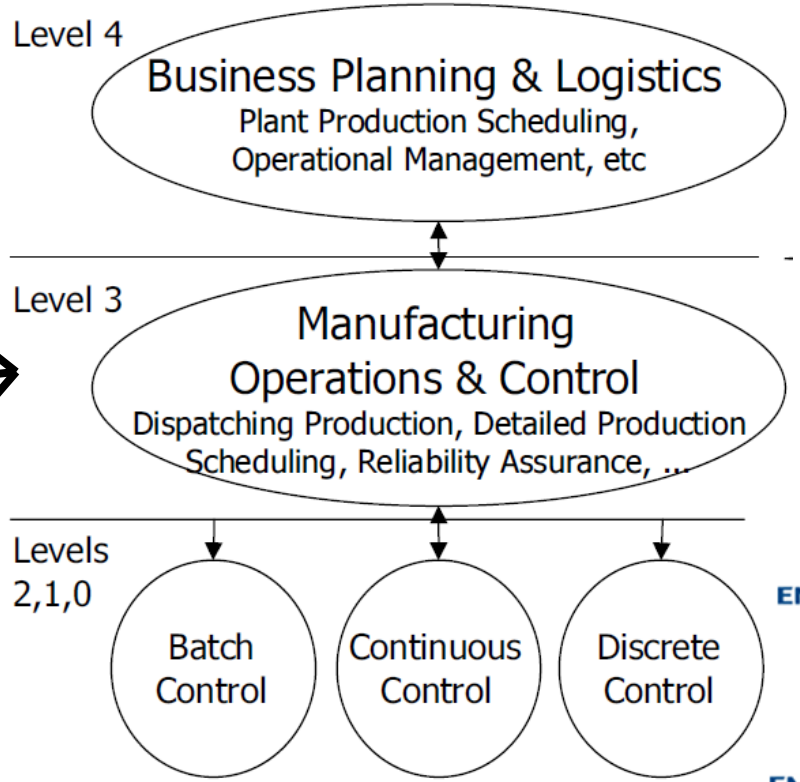
Sasolburg Solution Architecture based on ISA-95

Level 3: Sasolburg MOM Systems





ISA-95 Functional Model (ANSI/ISA–95.00.01–2000)

EMERSON. EMERSON. EMERSON. Rockwell Automation EMERSON. EMERSON. ABB Schneider Electric

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Business Progression

2013	2015
Multiple Emerson Delta V Systems each with its own historian. Tag licenses costly. Complicated IOPCHDA interfaces required. ABB and ControlLogix Controllers not integrated.	**One Data Archive** with 10k tags, with the same PI OPC DA client used for Emerson Delta V, ABB and ControlLogix.
Plant Displays only available from the control room.	**Host of PI Clients**: PI WebParts hosted in a MS SharePoint environment, PI Coresight and even PI DataLink. **Available on the company LAN or VPN**. At the office or at home.
Reporting and Notification capability practically non existent.	**Using PI OLEDB and SQL Server Reporting Services**, Reports can be easily scheduled and emailed. **Notifications used for critical events** that need immediate attention.

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Quick Wins: PI Coresight

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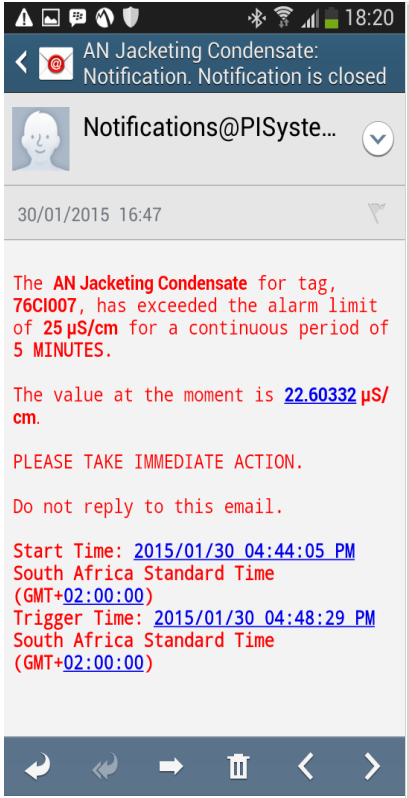
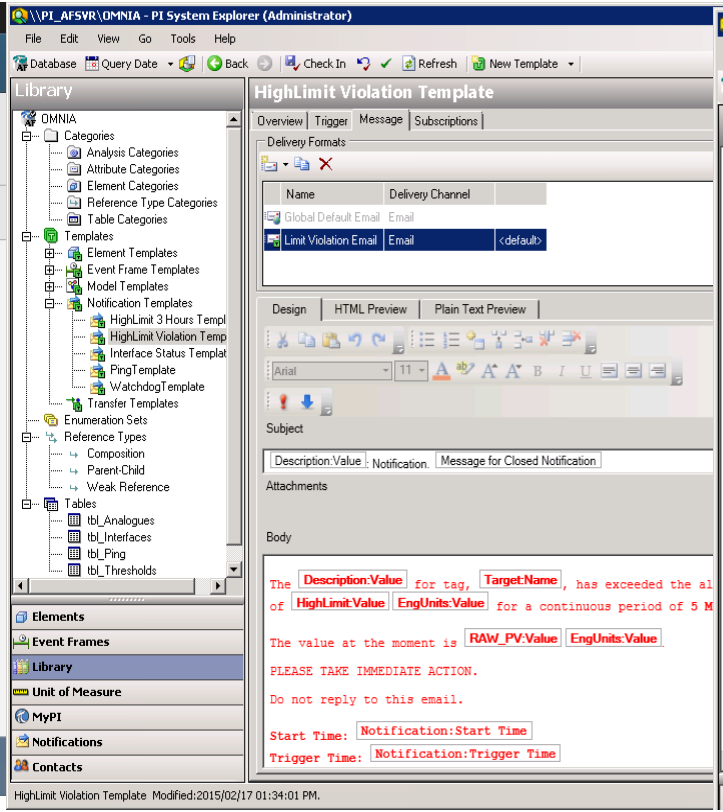
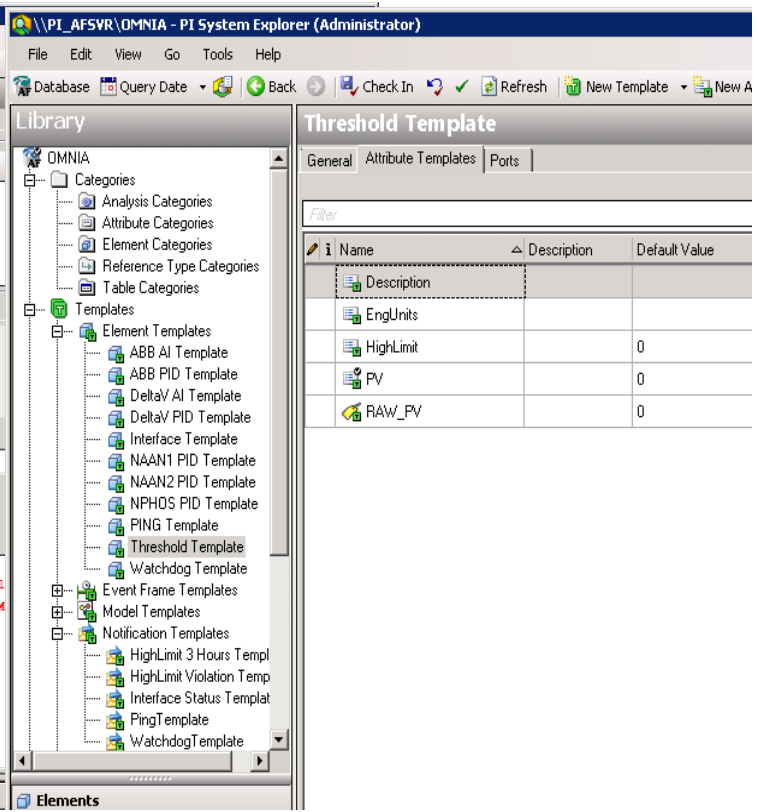
Quick Wins: Notifications







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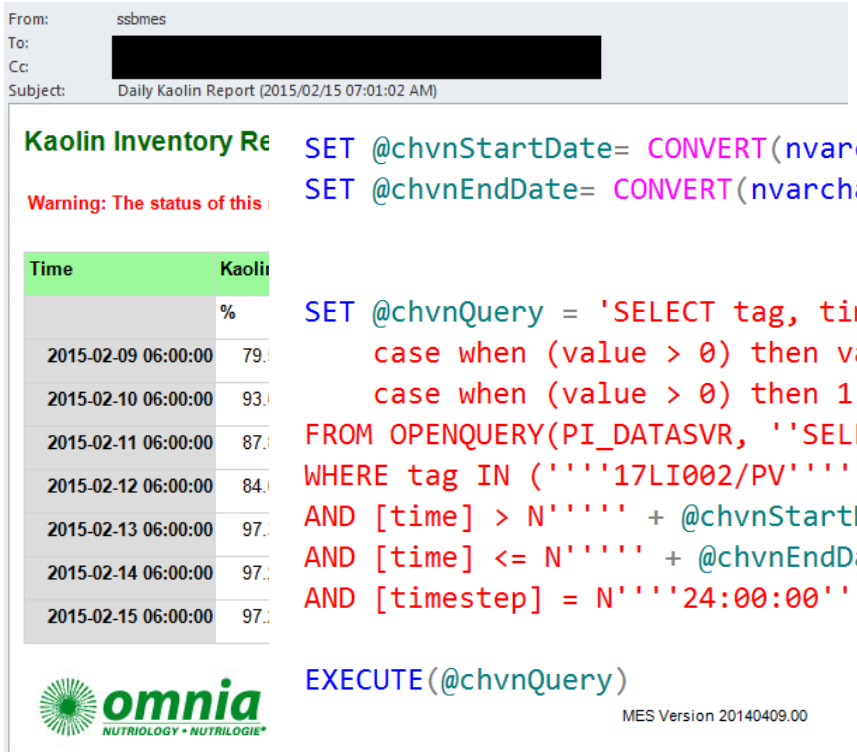
Quick Wins: Email Reports with SSRS




```
SET @chvnStartDate= CONVERT(nvarchar(14),@dtmEndDate-7, 120) + '00:00'
SET @chvnEndDate= CONVERT(nvarchar(14),@dtmEndDate, 120) + '00:00'


SET @chvnQuery = 'SELECT tag, time,
    case when (value > 0) then value else 0 end value1,
    case when (value > 0) then 1.5 * value else 0 end tons
FROM OPENQUERY(PI_DATASVR, ''SELECT tag, time, value FROM piarchive..piinterp
WHERE tag IN (''''17LI002/PV'''')
AND [time] > N''''' + @chvnStartDate + '''''
AND [time] <= N''''' + @chvnEndDate + '''''
AND [timestep] = N''''24:00:00'''''')'

EXECUTE(@chvnQuery)
```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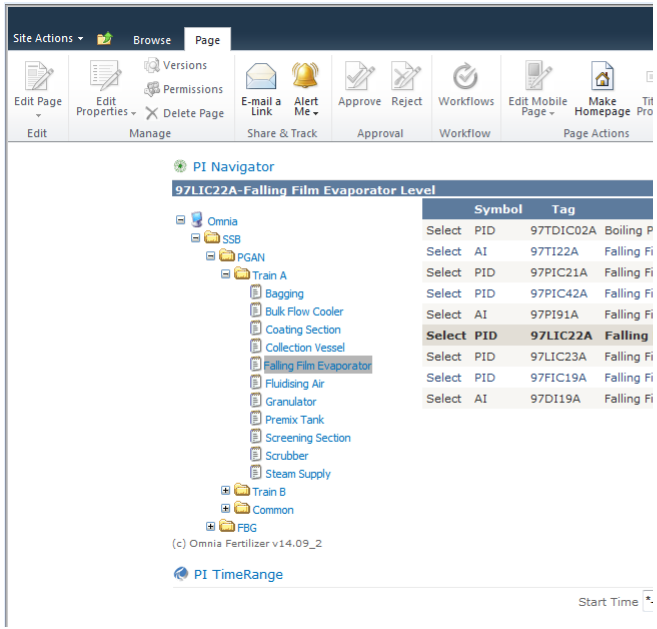
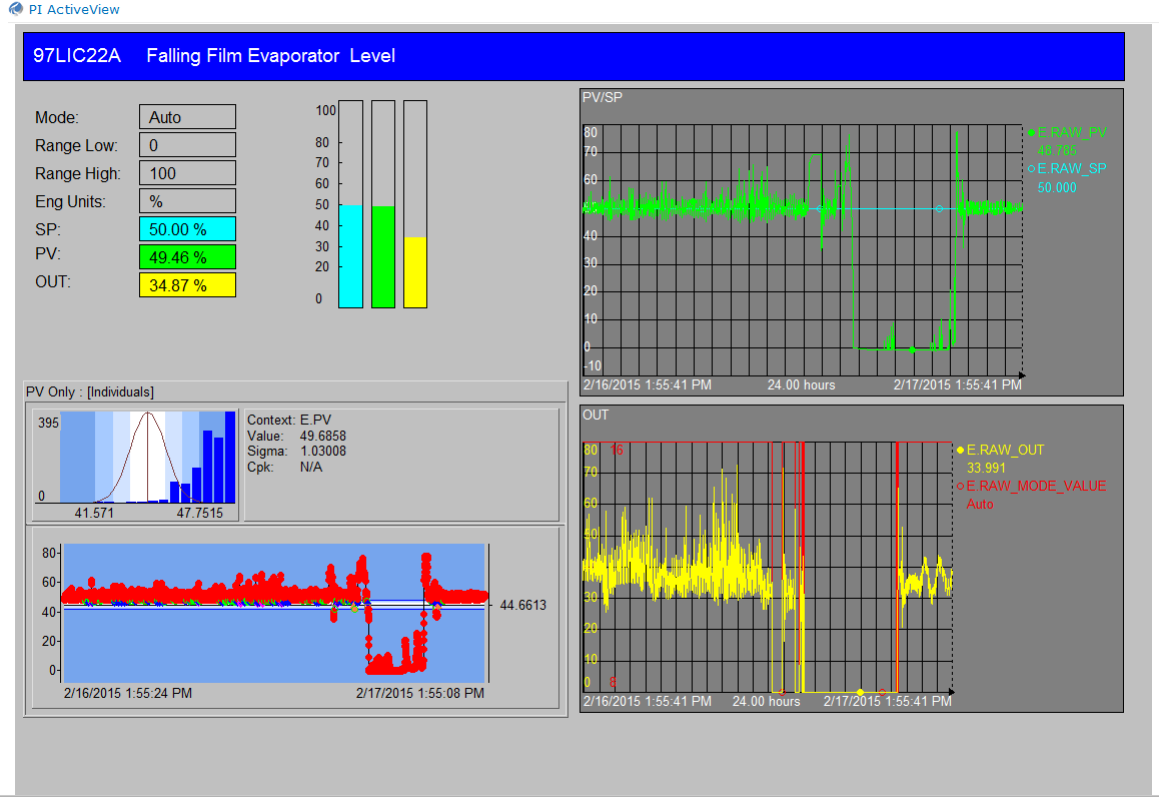
Quick Wins: PI SQC Chart





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MES Overview

- Custom developed Object Oriented MES (OOM[1]) based on both ISA-95 standards and general Object Oriented Programming architecture.
- Material, Equipment, Person, Process Segment and Custom objects.
- The MES is built upon Microsoft SQL Server and it provides the business context in which we can frame data from all financial and manufacturing systems,
- Asset Framework (AF) is also used to model our plant using ISA-95 principles.
- Interfaces allow for data to be captured from multiple systems, including the PI System, LIMS system, Environmental Systems and WAGES.

1. **Oom** (ˈuːəm) *n. South African* a title of respect used to address an elderly man. *In our context the term denotes a system that is inherently wise and trustworthy.*
2. **WAGES** *(Water, Air, Gas, Electricity and Steam)*

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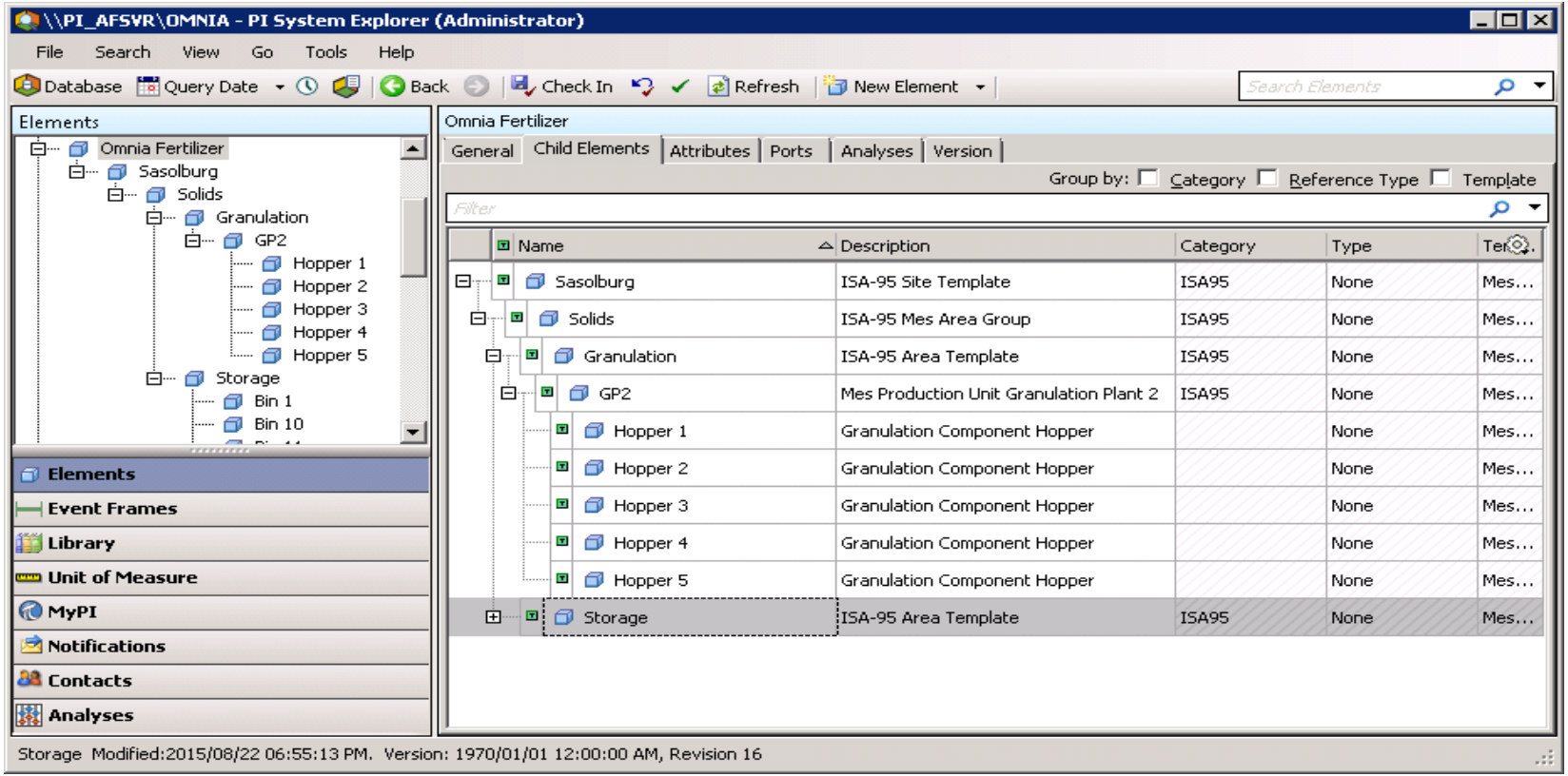
ISA-95 Model using AF



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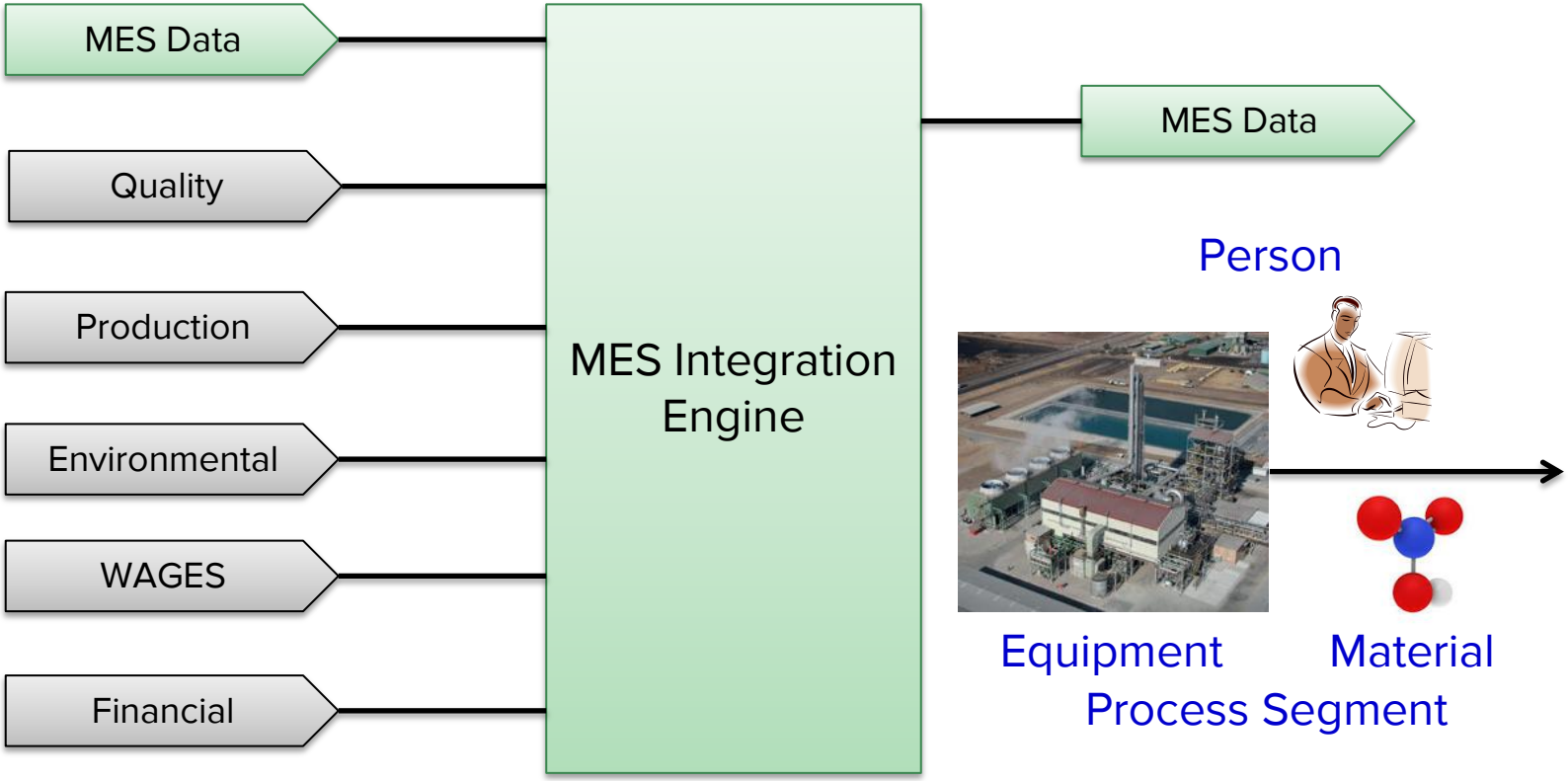
MES System Integration



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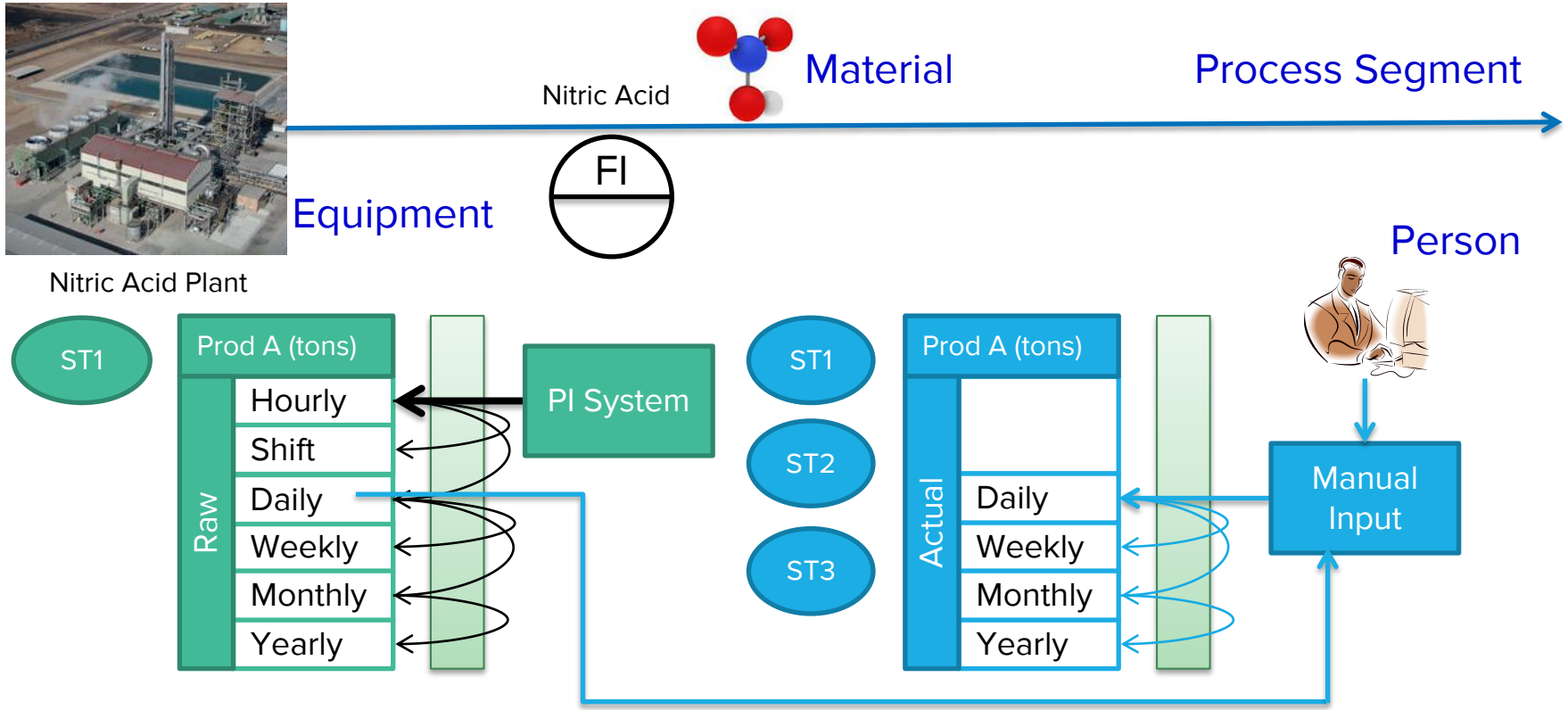
MES Aggregation



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MES Report

Page ▾ Safety ▾ Tools ▾

Home > OmniaSSRS01 > rptReport

Report Name: Nitrophos Report — Report View Name: Daily

Start Date: 2015/07/01 — End Date: 2015/08/21

1 of 1 — 100% — Find | Next

	1			2			3			4			5		
	Phos Rock In			Phos Rock Total P%			Phos Rock Mass P			Phos Rock Total Ca%			Phos Rock Mass Ca		
	t			%			t			%			t		
	Calculation			Labware			Calculation			Labware			Calculation		
StartDateTime	Raw			Raw			Raw			Raw			Raw		
2015-07-01 06:00	0.000	97	Final	16.160		Final	0.000		Final	38.315		Final	0.000		Final
2015-07-02 06:00	78.477	100	Final	15.670	100	Final	12.297	100	Final	38.840	100	Final	30.480	100	Final
2015-07-03 06:00	86.766	95	Final	16.195	100	Final	14.052	95	Final	38.490	100	Final	33.396	95	Final
2015-07-04 06:00	119.457	100	Final	16.070	100	Final	19.197	100	Final	37.400	100	Final	44.677	100	Final
2015-07-05 06:00	99.417	100	Final	15.525	100	Final	15.435	100	Final	39.550	100	Final	39.319	100	Final
2015-07-06 06:00	54.566	100	Final	16.290	100	Final	8.889	100	Final	39.115	100	Final	21.344	100	Final
2015-07-07 06:00	104.407	100	Final	16.220	100	Final	16.935	100	Final	37.885	100	Final	39.554	100	Final
2015-07-08 06:00	111.265	100	Final	15.935	100	Final	17.730	100	Final	39.670	100	Final	44.139	100	Final
2015-07-09 06:00	119.305	100	Final	16.420	100	Final	19.590	100	Final	37.765	100	Final	45.055	100	Final
2015-07-10 06:00	51.872	100	Final	15.925	100	Final	8.261	100	Final	38.355	100	Final	19.896	100	Final
2015-07-11 06:00	1.517	100	Final	16.110	100	Final	0.244	100	Final	36.110	100	Final	0.548	100	Final
2015-07-12 06:00	0.000	100	Final	16.420	100	Final	0.000	100	Final	38.900	100	Final	0.000	100	Final
2015-07-13 06:00	0.000	100	Final	15.550	100	Final	0.000	100	Final	39.500	100	Final	0.000	100	Final

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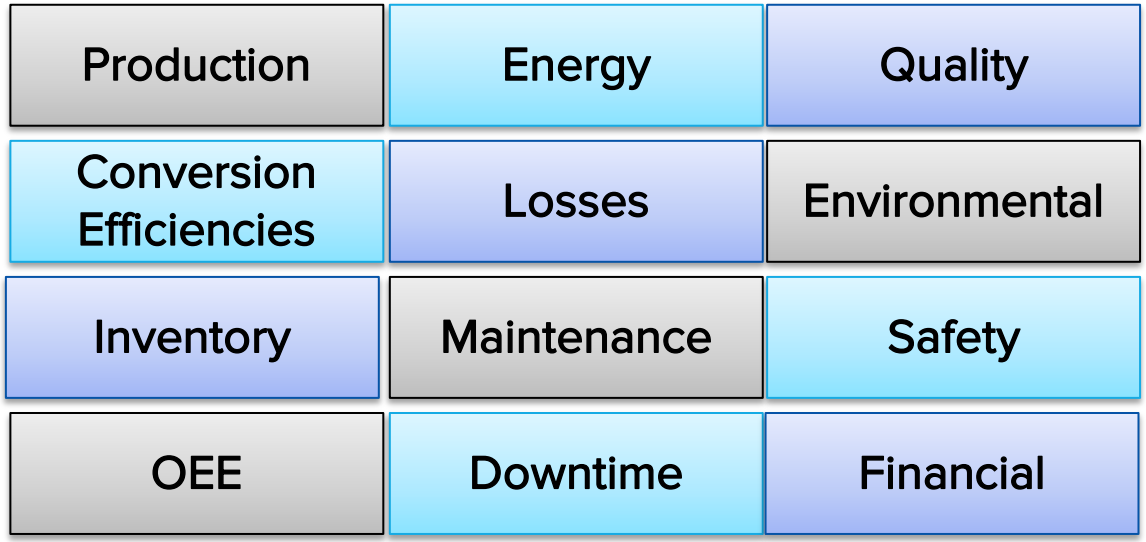
Operation Intelligence Metrics



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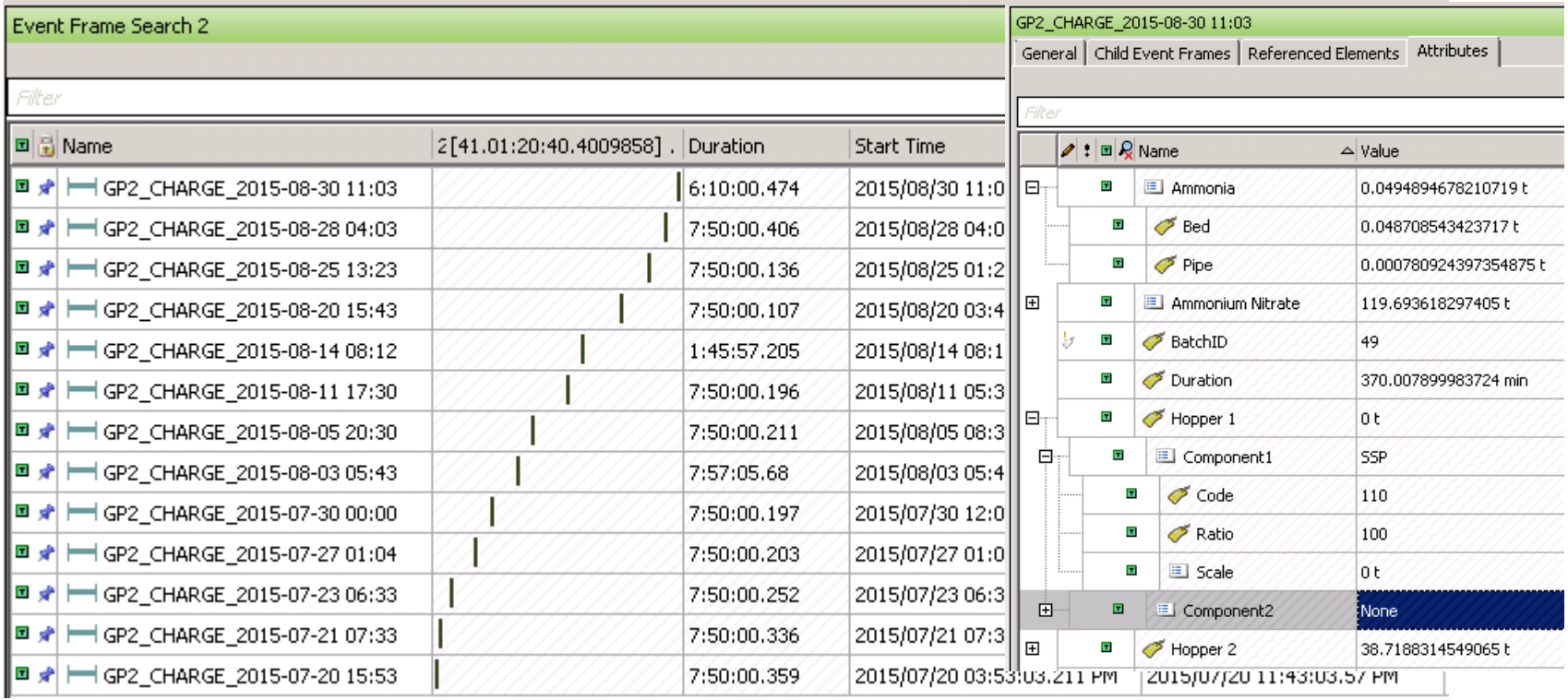
Granulation Batches



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Tangible Benefits

- Environmental and other notifications assist us in taking immediate action when thresholds are violated.
- Inventory reports are automatically sent to key suppliers on a daily basis.
- Key plant personnel now focus on improving plant efficiency and driving down costs as opposed to compiling reports.
- Significant increased production volumes over the 2015 Financial Year. The PI System is one of many contributing factors.
- In our PGAN plant we have increased run rates by as much as 15% by using the PI System to identify process changes.

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Intangible Benefits

- We are in the midst of an information renaissance.
- Anybody can easily access key plant metrics anywhere.
- Moving towards one version of the truth.
- Moving from reactive towards proactive.

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Future Plans and Next Steps

- Schedule Predictive Maintenance work orders in our EAM (Enterprise Asset Management)
- Downtime tracking and reporting (using Event Frames)
- Asset Analytics
- Future Data for key Planning and Scheduling metrics
- Variance Monitoring by tracking process excursions and creating notifications

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PI System Enabled MES

"The convergence of financial and operational data and systems is a strategic imperative to help drive the improvement in plant performance. The ability to extract greater performance value is based on the quality and relevance of information that management base their decisions on. The role of MES (and the PI System) have never been more important than it is in the current environment to drive down costs, improve efficiency and increase our financial performance of the plants."

Wayne Koonin (Omnia Group Finance Director)

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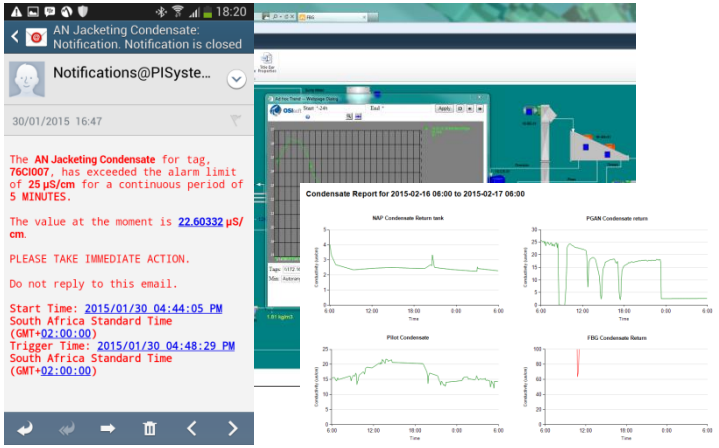

BUSINESS CHALLENGES

- Process Data visible only in the control room – impacting both decision making latency and process improvement strategy.
- Reactive Problem Solving
- Manual Log sheets for data capture.
- Tough economic climate. Make more with less.

SOLUTION

- Asset Framework, PI WebParts and PI Coresight provide enhanced visualization capability.
- Notifications used for proactive email alerts.
- Integration of PI System data into custom MES solution.
- MES drives cost reduction and production improvement strategies.

RESULTS AND BENEFITS

- In our PGAN plant we have increased run rates by as much as 15%
- FY2015 – Seen increase in production volume and decrease in production costs.
- Less time spent by key personnel on mundane tasks such as manually compiling reports.

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Contact Information

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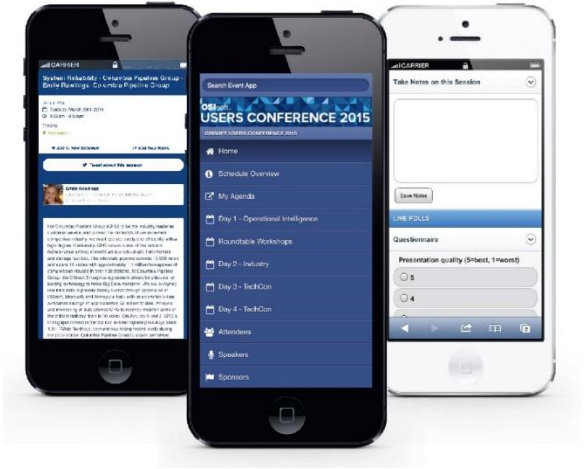
Questions

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

State your
name & company

Please don't forget to…

Complete the Online Survey for this session



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谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado

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