



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

Presented by Yashin Parsard



Agenda

- About Omnia
- MES Team: Our Journey
- Sasolburg Solution Architecture
- Quick Wins with the PI System
- MES Architecture
- Tangible Benefits
- Intangible Benefits
- Future Plans and Next Steps
- Summary

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

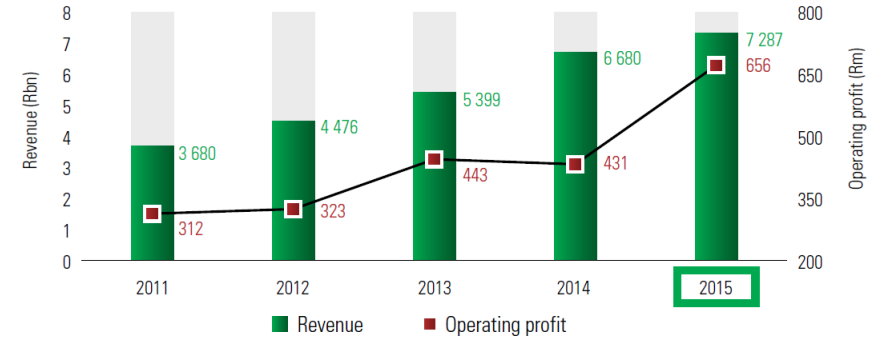
52% INCREASE

2015 Revenue

R7.29bn

9% INCREASE

REVENUE AND OPERATING PROFIT



Omnia Agriculture Results FY2015



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

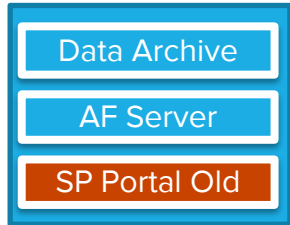
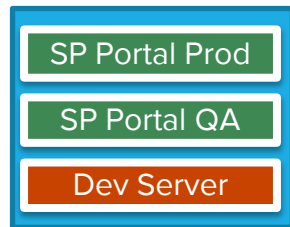
2013

2014

2015

Sasolburg Solution Architecture based on ISA-95

Level 3: Sasolburg MOM Systems



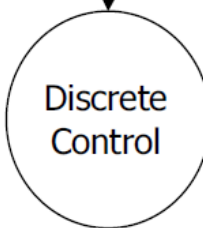
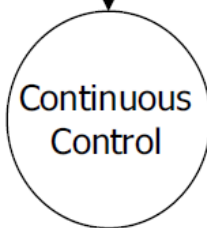
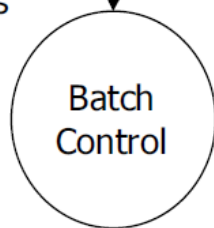
Level 4



Level 3



Levels
2,1,0



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



Business Progression

2013

Multiple Emerson Delta V Systems each with its own historian. Tag licenses costly. Complicated IOPCHDA interfaces required. ABB and ControlLogix Controllers not integrated.

Plant Displays only available from the control room.

Reporting and Notification capability practically non existent.

2015

One Data Archive with 10k tags, with the same PI OPC DA client used for Emerson Delta V, ABB and ControlLogix.

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.

Using PI OLEDB and SQL Server Reporting Services, Reports can be easily scheduled and emailed. **Notifications used for critical events** that need immediate attention.


Quick Wins: PI Coresight



Quick Wins: Notifications

18:20

AN Jacketing Condensate:
Notification. Notification is closed

 Notifications@PISyste...

30/01/2015 16:47

The **AN Jacketing Condensate** for tag, **76CI007**, has exceeded the alarm limit of **25 μ S/cm** for a continuous period of **5 MINUTES**.

The value at the moment is **22.60332 μ S/cm**.

PLEASE TAKE IMMEDIATE ACTION.

Do not reply to this email.

Start Time: **2015/01/30 04:44:05 PM**
South Africa Standard Time
(GMT+02:00:00)
Trigger Time: **2015/01/30 04:48:29 PM**
South Africa Standard Time
(GMT+02:00:00)

PI_AFSVR\OMNIA - PI System Explorer (Administrator)

File Edit View Go Tools Help

Database Query Date Back Check In Refresh New Template

Library

OMNIA

- Categories
 - Analysis Categories
 - Attribute Categories
 - Element Categories
 - Reference Type Categories
 - Table Categories
- Templates
 - Element Templates
 - Event Frame Templates
 - Model Templates
 - Notification Templates
 - HighLimit 3 Hours Templ
 - HighLimit Violation Temp
 - Interface Status Template
 - PingTemplate
 - WatchdogTemplate
 - Transfer Templates
- Enumeration Sets
- Reference Types
 - Composition
 - Parent-Child
 - Weak Reference
- Tables
 - tbl_Analogues
 - tbl_Interfaces
 - tbl_Ping
 - tbl_Thresholds

HighLimit Violation Template

Overview Trigger Message Subscriptions

Delivery Formats

- Name Delivery Channel
- Global Default Email Email
- Limit Violation Email Email <default>

Design HTML Preview Plain Text Preview

Subject

Description: Value : Notification. Message for Closed Notification

Attachments

Body

The **Description:Value** for tag, **TargetName**, has exceeded the al of **HighLimit:Value** **EngUnits:Value** for a continuous period of 5 M

The value at the moment is **RAW_PV:Value** **EngUnits:Value**

PLEASE TAKE IMMEDIATE ACTION.

Do not reply to this email.

Start Time: **Notification:Start Time**

Trigger Time: **Notification:Trigger Time**

HighLimit Violation Template Modified:2015/02/17 01:34:01 PM.

PI_AFSVR\OMNIA - PI System Explorer (Administrator)

File Edit View Go Tools Help

Database Query Date Back Check In Refresh New Template New A

Library

OMNIA

- Categories
 - Analysis Categories
 - Attribute Categories
 - Element Categories
 - Reference Type Categories
 - Table Categories
- Templates
 - Element Templates
 - ABB AI Template
 - ABB PID Template
 - DeltaV AI Template
 - DeltaV PID Template
 - Interface Template
 - NAAN1 PID Template
 - NAAN2 PID Template
 - NPHOS PID Template
 - PING Template
 - Threshold Template
 - Watchdog Template
 - Event Frame Templates
 - Model Templates
 - Notification Templates
 - HighLimit 3 Hours Templ
 - HighLimit Violation Temp
 - Interface Status Template
 - PingTemplate
 - WatchdogTemplate

Threshold Template

General Attribute Templates Ports

Filter

Name	Description	Default Value
EngUnits		
HighLimit		0
PV		0
RAW_PV		0

Elements

Quick Wins: Email Reports with SSRS

From: ssbmcs
To: [REDACTED]
Cc: [REDACTED]
Subject: Daily Kaolin Report (2015/02/15 07:01:02 AM)

Kaolin Inventory Report

Warning: The status of this report is **Warning**.

Time	Kaolin
	%
2015-02-09 06:00:00	79.1
2015-02-10 06:00:00	93.1
2015-02-11 06:00:00	87.1
2015-02-12 06:00:00	84.1
2015-02-13 06:00:00	97.1
2015-02-14 06:00:00	97.1
2015-02-15 06:00:00	97.1



```
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)
```

MES Version 20140409.00

Quick Wins: PI SQC Chart

Site Actions ▾ Browse Page

Edit Page Edit Properties Manage Versions Permissions E-mail a Link Alert Me Approve Reject Workflows Edit Mobile Page Make Homepage Tit Pro Page Actions

PI Navigator

97LIC22A-Falling Film Evaporator Level

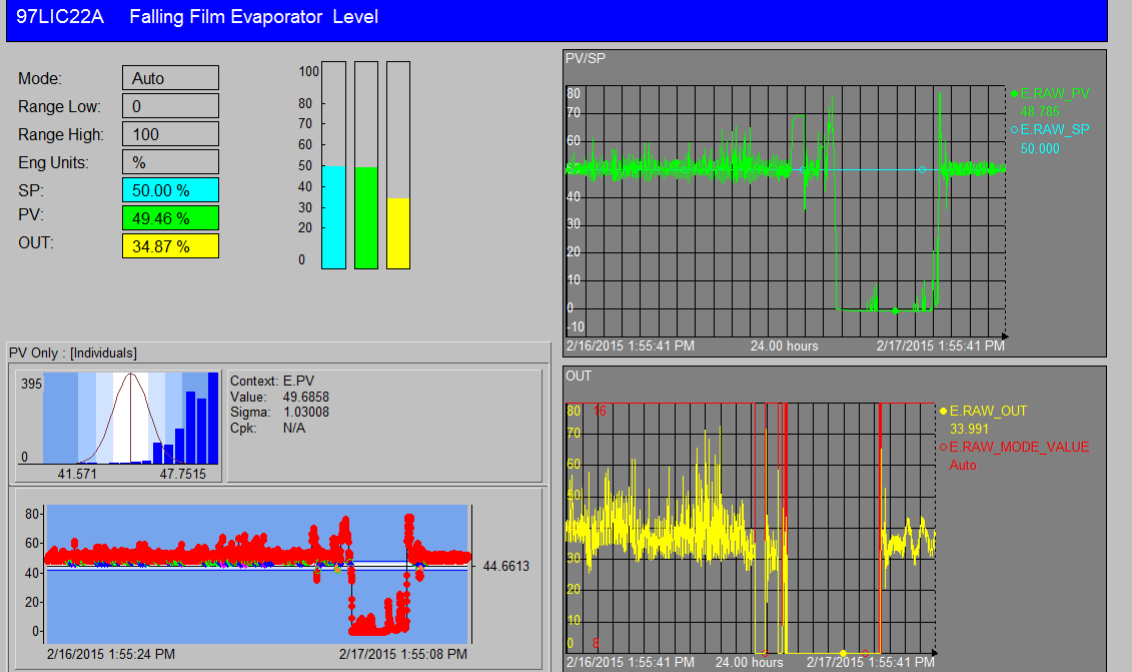
	Symbol	Tag
Select	PID	97TDIC02A Boiling P
Select	AI	97TI22A Falling Fi
Select	PID	97PIC21A Falling Fi
Select	PID	97PIC42A Falling Fi
Select	AI	97PI91A Falling Fi
Select	PID	97LIC22A Falling
Select	PID	97LIC23A Falling Fi
Select	PID	97FIC19A Falling Fi
Select	AI	97DI19A Falling Fi

(c) Omnia Fertilizer v14.09_2

PI TimeRange

Start Time ▾

PI ActiveView



MES Overview

- Custom developed Object Oriented MES (OOM¹) 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** ('u:əm) *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*)

ISA-95 Model using AF

\\PI_AFSVR\OMNIA - PI System Explorer (Administrator)

File Search View Go Tools Help

Database Query Date Back Check In Refresh New Element Search Elements

Elements

- Omnia Fertilizer
 - Sasolburg
 - Solids
 - Granulation
 - GP2
 - Hopper 1
 - Hopper 2
 - Hopper 3
 - Hopper 4
 - Hopper 5
 - Storage
 - Bin 1
 - Bin 10

Omnia Fertilizer

General Child Elements Attributes Ports Analyses Version

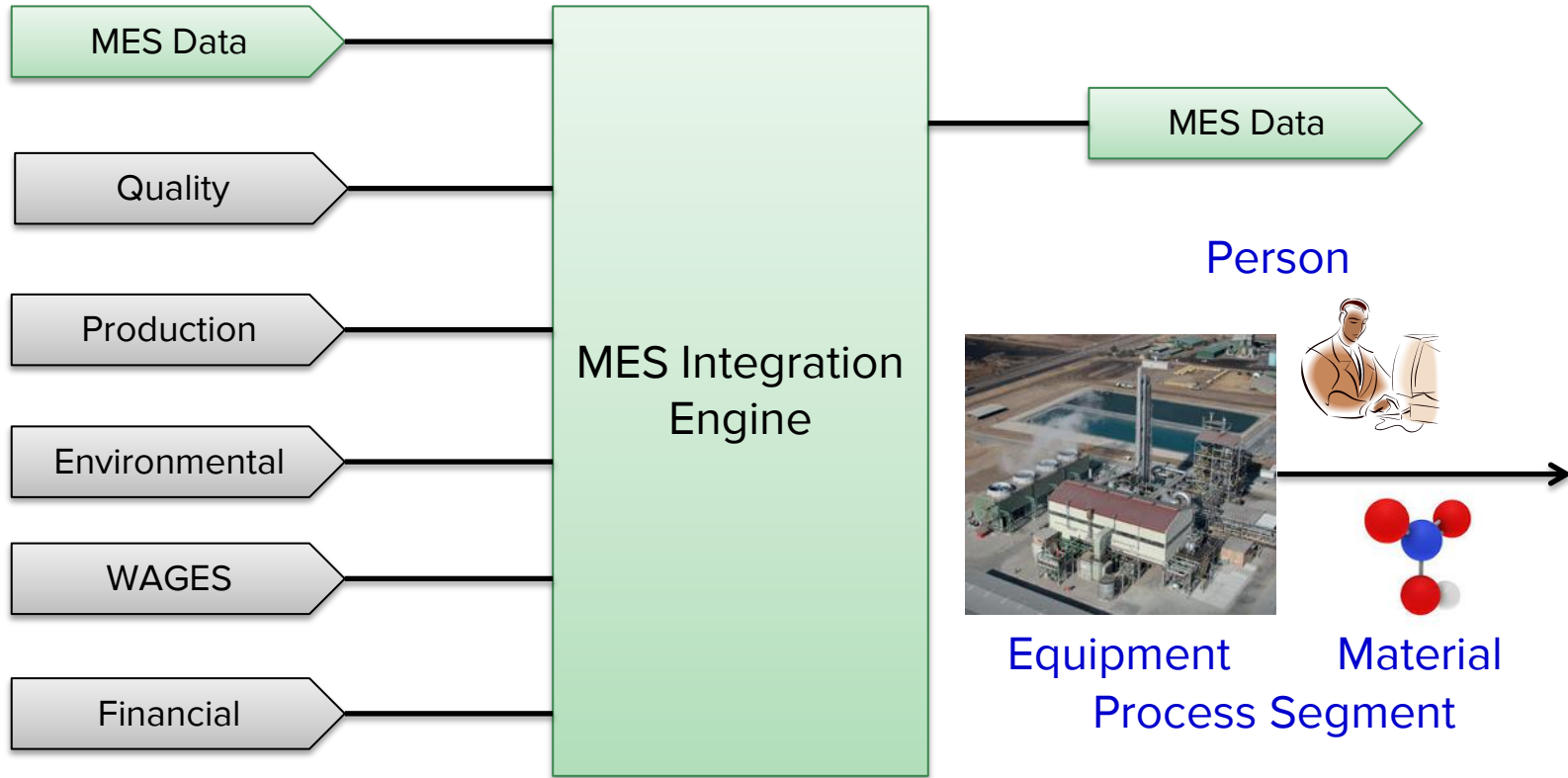
Group by: ☐ Category ☐ Reference Type ☐ Template

Filter

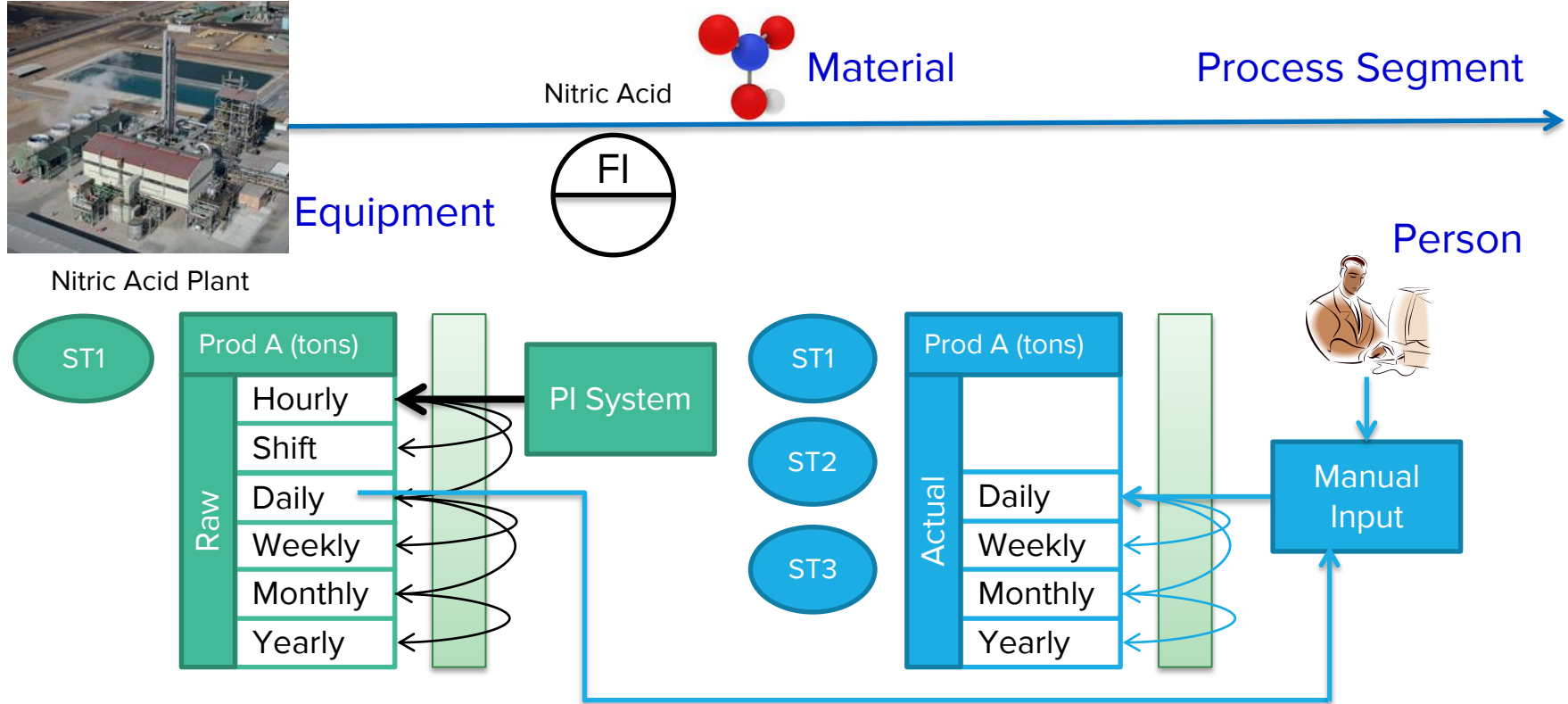
Name	Description	Category	Type	Tex...
Sasolburg	ISA-95 Site Template	ISA95	None	Mes...
Solids	ISA-95 Mes Area Group	ISA95	None	Mes...
Granulation	ISA-95 Area Template	ISA95	None	Mes...
GP2	Mes Production Unit Granulation Plant 2	ISA95	None	Mes...
Hopper 1	Granulation Component Hopper		None	Mes...
Hopper 2	Granulation Component Hopper		None	Mes...
Hopper 3	Granulation Component Hopper		None	Mes...
Hopper 4	Granulation Component Hopper		None	Mes...
Hopper 5	Granulation Component Hopper		None	Mes...
Storage	ISA-95 Area Template	ISA95	None	Mes...

Storage Modified:2015/08/22 06:55:13 PM. Version: 1970/01/01 12:00:00 AM, Revision 16

MES System Integration



MES Aggregation



Operation Intelligence Metrics

Production	Energy	Quality
Conversion Efficiencies	Losses	Environmental
Inventory	Maintenance	Safety
OEE	Downtime	Financial

Granulation Batches

Event Frame Search 2					GP2_CHARGE_2015-08-30 11:03	
Filter					General Child Event Frames Referenced Elements Attributes	
Filter					Filter	
Name	2[41.01:20:40.4009858]	Duration	Start Time		Name	Value
GP2_CHARGE_2015-08-30 11:03		6:10:00.474	2015/08/30 11:0		Ammonia	0.0494894678210719 t
GP2_CHARGE_2015-08-28 04:03		7:50:00.406	2015/08/28 04:0		Bed	0.048708543423717 t
GP2_CHARGE_2015-08-25 13:23		7:50:00.136	2015/08/25 01:2		Pipe	0.000780924397354875 t
GP2_CHARGE_2015-08-20 15:43		7:50:00.107	2015/08/20 03:4		Ammonium Nitrate	119.693618297405 t
GP2_CHARGE_2015-08-14 08:12		1:45:57.205	2015/08/14 08:1		BatchID	49
GP2_CHARGE_2015-08-11 17:30		7:50:00.196	2015/08/11 05:3		Duration	370.007899983724 min
GP2_CHARGE_2015-08-05 20:30		7:50:00.211	2015/08/05 08:3		Hopper 1	0 t
GP2_CHARGE_2015-08-03 05:43		7:57:05.68	2015/08/03 05:4		Component1	SSP
GP2_CHARGE_2015-07-30 00:00		7:50:00.197	2015/07/30 12:0		Code	110
GP2_CHARGE_2015-07-27 01:04		7:50:00.203	2015/07/27 01:0		Ratio	100
GP2_CHARGE_2015-07-23 06:33		7:50:00.252	2015/07/23 06:3		Scale	0 t
GP2_CHARGE_2015-07-21 07:33		7:50:00.336	2015/07/21 07:3		Component2	None
GP2_CHARGE_2015-07-20 15:53		7:50:00.359	2015/07/20 03:53:03.211 PM		Hopper 2	38.7188314549065 t

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.

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.

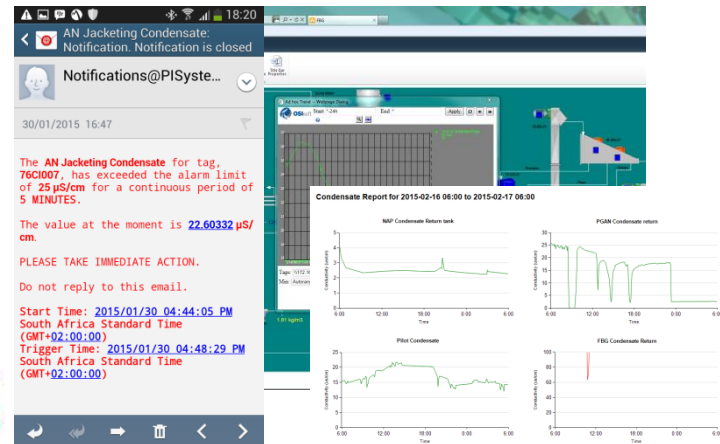
Future Plans and Next Steps

- 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

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)



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.

Contact Information

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Omnia Fertilizer, South Africa



Questions

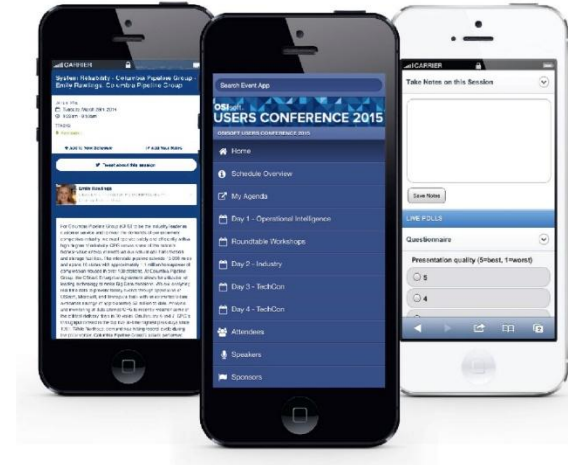
Please wait for the **microphone** before asking your questions



State your
name & company

Please don't forget to...

Complete the Online Survey
for this session



<http://eventmobi.com/emeauc15>



감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado