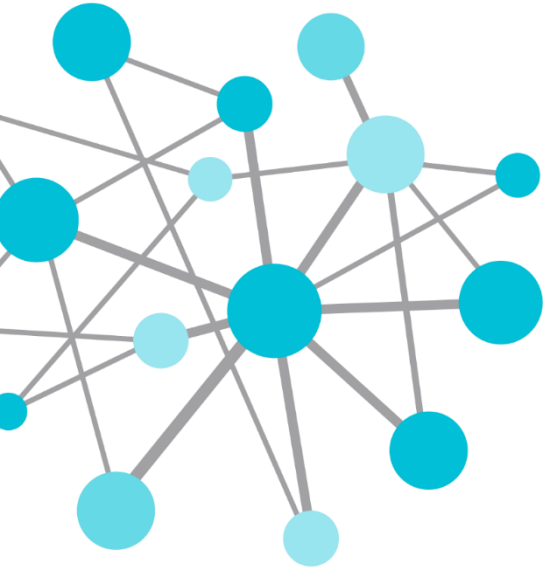


# Rapid Insights with Data Analytics – Tate & Lyle Case Study

TATE & LYLE

Presented by **Mark Massey, Tate & Lyle**

**Gopal GopalKrishnan, P.E., OSIsoft**

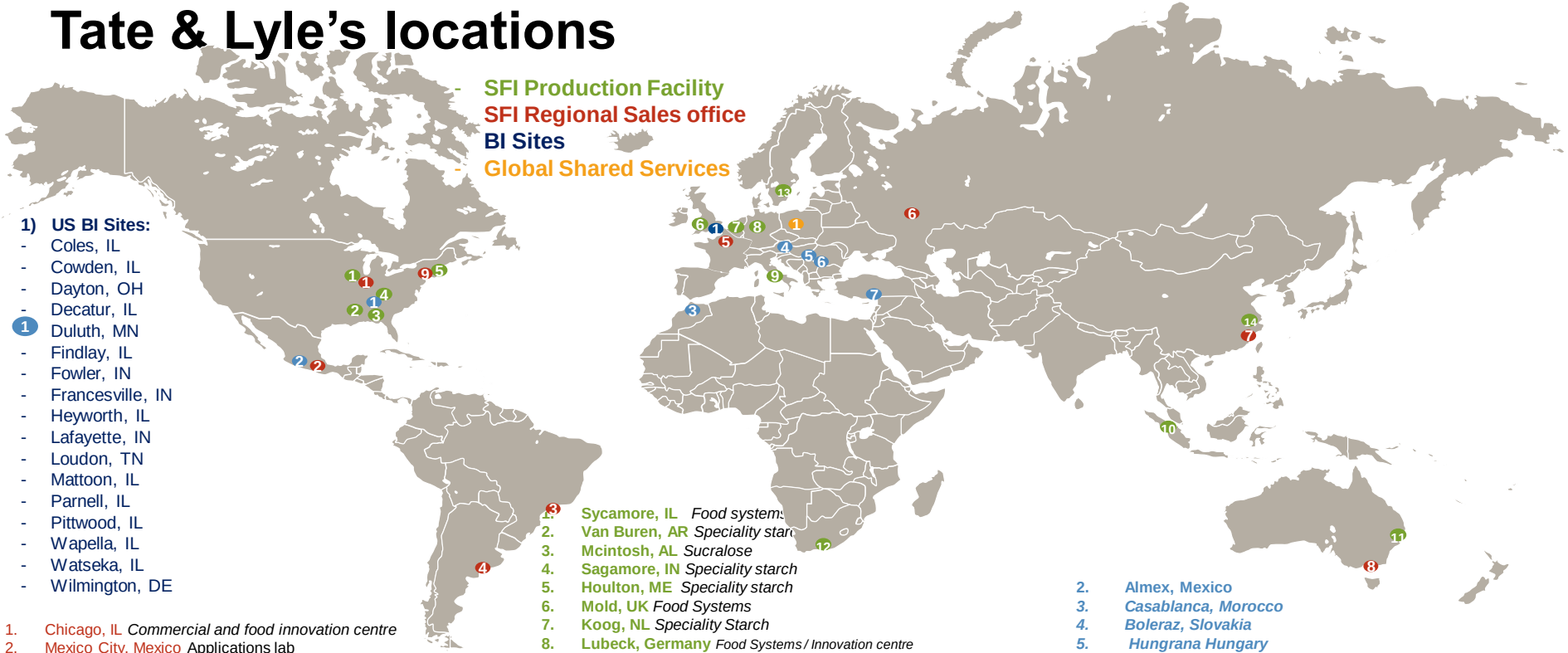
# Tate & Lyle overview

- Founded in the UK in the mid 19th century, the Tate and Lyle businesses merged to form Tate & Lyle in 1921
- Headquarters in London and listed on London Stock Exchange:
  - constituent of FTSE 250
  - market capitalisation of £3.7 billion(1)
- Business built on Core Values of Safety, Respect and Integrity
- Operations including production facilities and laboratories in more than 30 countries
- Over 4,500 employees worldwide
- Sales of £3.2 billion(2) and adjusted profit before tax of £322 million(2)(3)
- Over 70% of sales into food and beverage market
- Customers include many of the world's largest food and beverage manufacturers, and industrial and pharmaceutical businesses.

(1) At 11 June 2014
(2) For financial year ended 31 March 2014
(3) Excluding exceptional items and amortisation of acquired intangible assets and net retirement benefit interest

# Tate & Lyle's locations

- SFI Production Facility
- SFI Regional Sales office
- BI Sites
- Global Shared Services



**1) US BI Sites:**

- Coles, IL
- Cowden, IL
- Dayton, OH
- Decatur, IL
- Duluth, MN
- Findlay, IL
- Fowler, IN
- Francesville, IN
- Heyworth, IL
- Lafayette, IN
- Loudon, TN
- Mattoon, IL
- Parnell, IL
- Pittwood, IL
- Wapella, IL
- Watseka, IL
- Wilmington, DE

1. Chicago, IL *Commercial and food innovation centre*
2. Mexico City, Mexico Applications lab
3. Sao Paulo, Brazil *Regional sales office / lab*
4. Buenos Aires, Argentina *Applications lab*
5. Lille, France *Innovation centre*
6. Moscow, Russia *Regional sales office / Food systems*
7. Shanghai, China *Regional sales office / Lab*
8. Melbourne, AU *Applications lab*

1. **Sycamore, IL** *Food systems*
2. **Van Buren, AR** *Speciality starc*
3. **Mcintosh, AL** *Sucralose*
4. **Sagamore, IN** *Speciality starch*
5. **Houlton, ME** *Speciality starch*
6. **Mold, UK** *Food Systems*
7. **Koog, NL** *Speciality Starch*
8. **Lubeck, Germany** *Food Systems / Innovation centre*
9. **Noto, Ossono, Bergamo, Italy** *Food systems/Applications lab*
10. **Singapore** *Sucralose / Applications lab*
11. **Brisbane, AU** *Food Systems*
12. **Johannesburg, SA** *Food Systems*
13. **Kimstad, Sweden** *SFI ,Tate & Lyle Oat Ingredients*
14. **Suqian, China** *Food Systems, Jiangsu Province, China*
    **Xuzhou, China** *Food Systems applications lab*

2. **Almex, Mexico**
3. ***Casablanca, Morocco***
4. ***Boleraz, Slovakia***
5. ***Hungrana Hungary***
6. ***Razgrad, Bulgaria***
7. ***Adana, Turkey***

***1*** ***Lodz, Poland***

***1*** ***Head office / SFI Headquarters***

# Tate & Lyle's ingredients portfolio

## Speciality Food Ingredients

Sales £983m[1] Adjusted Operating Profit £213m[1][2]

### Starch-based Speciality Ingredients

- Speciality starches
- Speciality sweeteners
- Speciality fibres


### High-Intensity Sweeteners

- SPLENDA® Sucralose
- PUREFRUIT™ monk fruit extract
- TASTEVA® Stevia Sweetener


Purefruit monk fruit extract

### Food Systems

- Dairy stabilizer systems
- "Bespoke" blending


## Bulk Ingredients

Sales £2,164m[1] Adjusted Operating Profit £172m[1][2]

### US Sweeteners

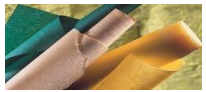
- Corn syrups
- Dextrose
- Glucose


### EU Sweeteners

- Corn syrups
- Dextrose
- Glucose


### Industrial and other

- Starches for paper and paperboard
- Acidulants/fermentation/bio-based products and ethanol
- Corn co-products incl. animal feed




[1] For financial year ended 31 March 2014, [2] Excluding exceptional items and amortisation of acquired intangible assets

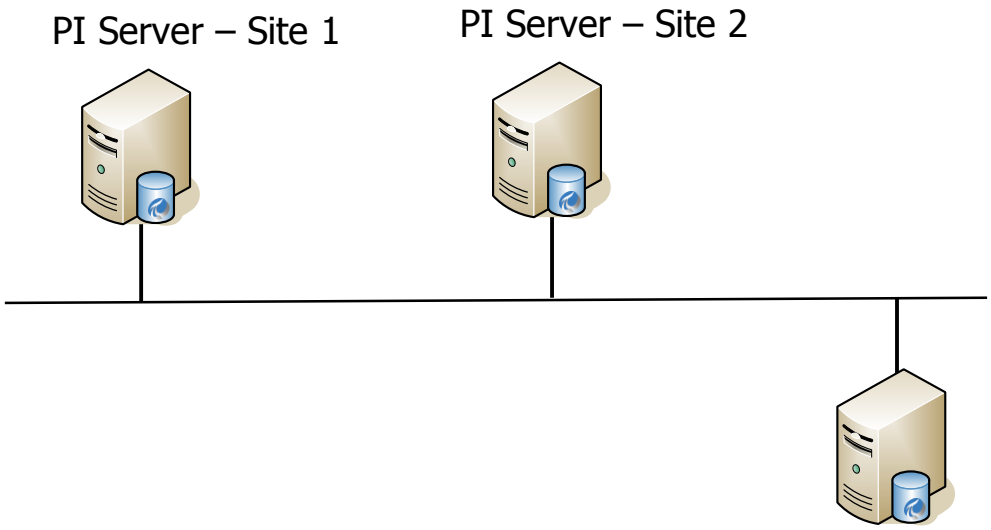
# Tate & Lyle serves major customers worldwide

# PI System at Tate & Lyle

- Tate & Lyle standardized on PI in 2000
- The PI system consists of 19 historian servers at 16 sites
  - Each site has a local PI administrator but with little central oversight
  - 486,00 licensed tags
  - 57 interfaces
  - Centralized PI server in Decatur
  - Centralized PI server in Europe
- All servers running pre-PI2010
- Primary tools in use are PI ProcessBook and PI DataLink
- Operations heavily relies on PI as a decision driver

How can we move from being data consumers to information innovators?

# PI System Sandbox




http://vCampus.osisoft.com

PI System – Sandbox for Experiments

Win 2008 R2 or Win 2012 (80GB disk and 16GB RAM)

Office Excel 64 bit - 2010 or 2013
PowerPivot or PowerView

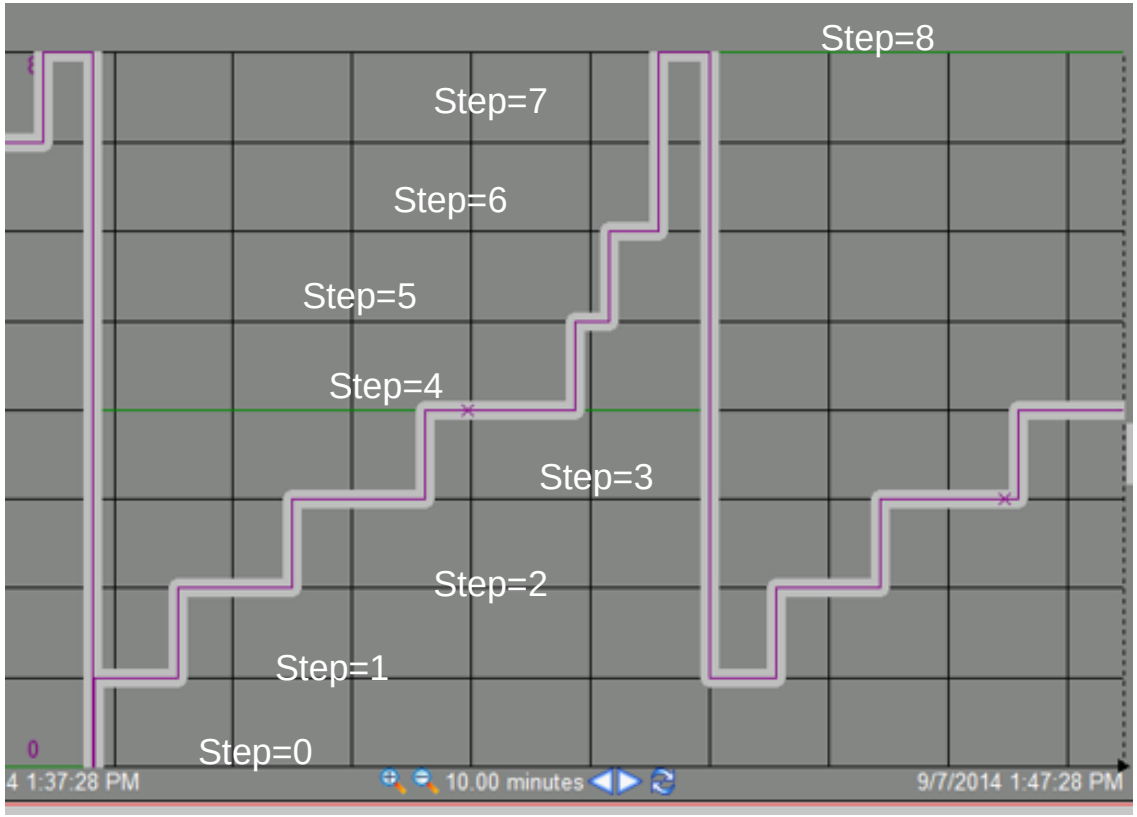
PI Server (vCampus license is OK)
SQL 2012 (SQL Express is OK)
AF 2014 R2 (Server and Client)
EFGen
PI SMT
PI Builder
PI OLEDB Enterprise
PI DataLink 2014
PI ProcessBook 2014
PI Coresight 2014

# Rapid Insights

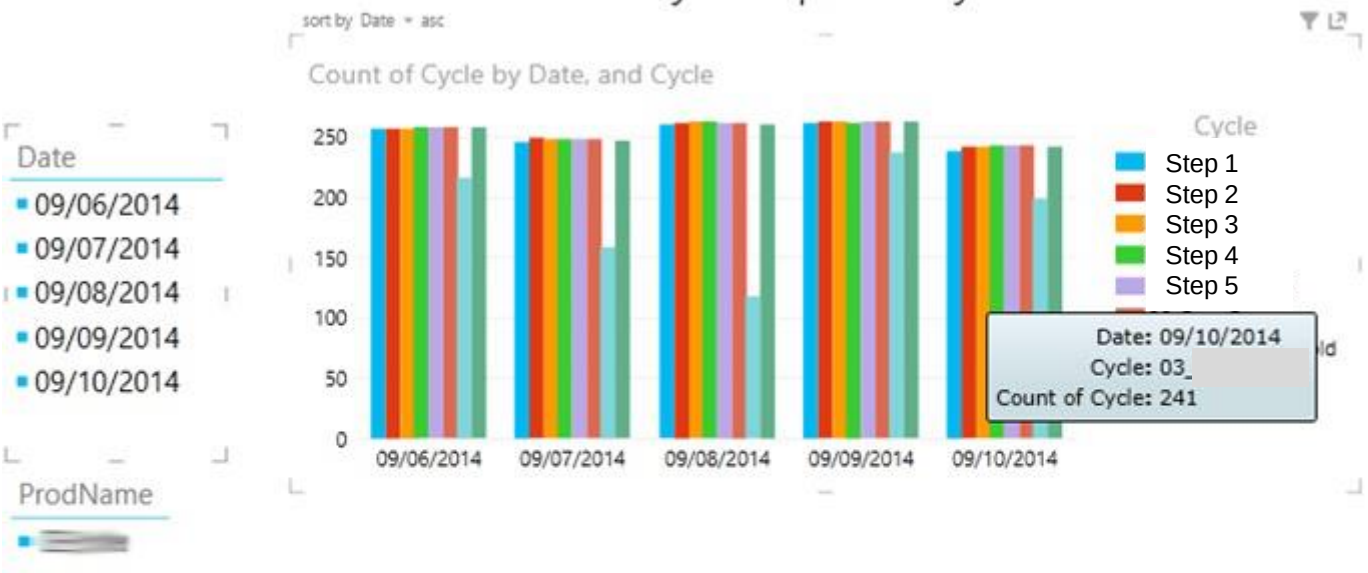
- Where is the process spending time?
- How can I monitor key metrics?
- Where are the downtimes? What is the OEE?
- How can I track energy?
- How can I improve throughput?
- … … … …
- Show me – by product, by process cycle, by day…
- Can the new tools bring any insight into my process?

And, we need all this in 2 weeks…

# Batch Operation



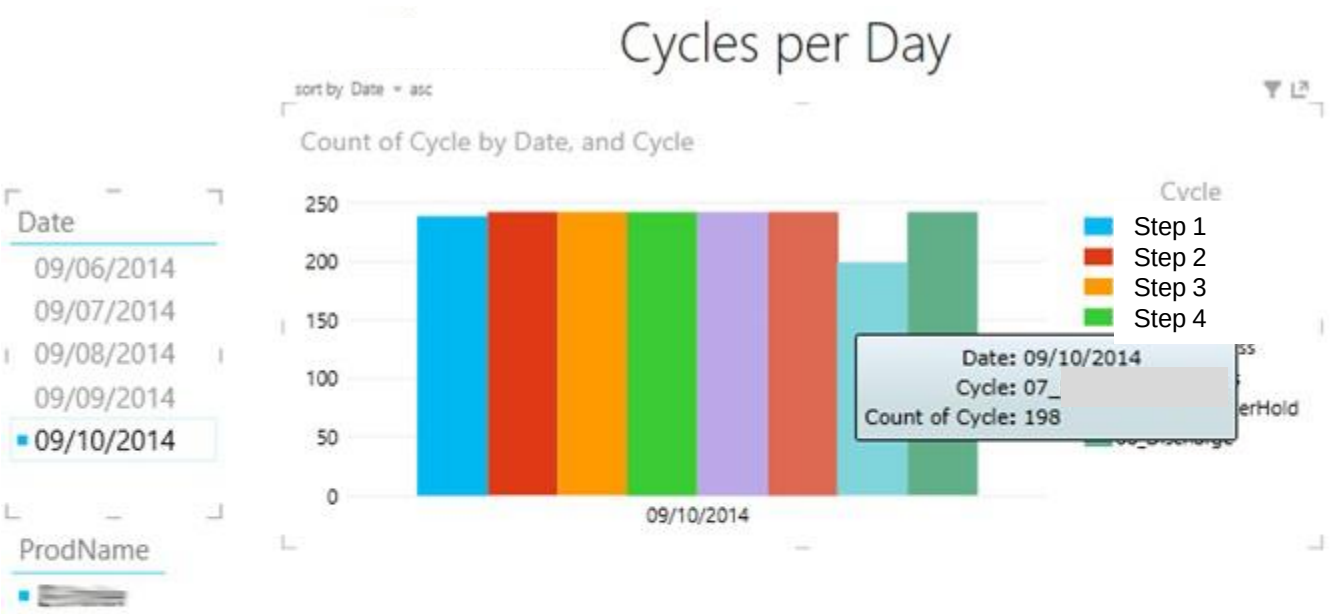
# Cycles per Day




| Date | Production |
|---|---|
| 09/06/2014 | 519 |
| 09/07/2014 | 566 |
| 09/08/2014 | 521 |
| 09/09/2014 | 527 |
| 09/10/2014 | 537 |

| Date | Downtime_Hours |
|---|---|
| 09/06/2014 | 1.42 |
| 09/07/2014 | 2.33 |
| 09/08/2014 | 1.83 |
| 09/09/2014 | 1.75 |
| 09/10/2014 | 3.00 |

# Cycles per Day




| Date | Production |
|---|---|
| 09/06/2014 | 519 |
| 09/07/2014 | 566 |
| 09/08/2014 | 521 |
| 09/09/2014 | 527 |
| 09/10/2014 | 537 |

| Date | Downtime_Hours |
|---|---|
| 09/06/2014 | 1.42 |
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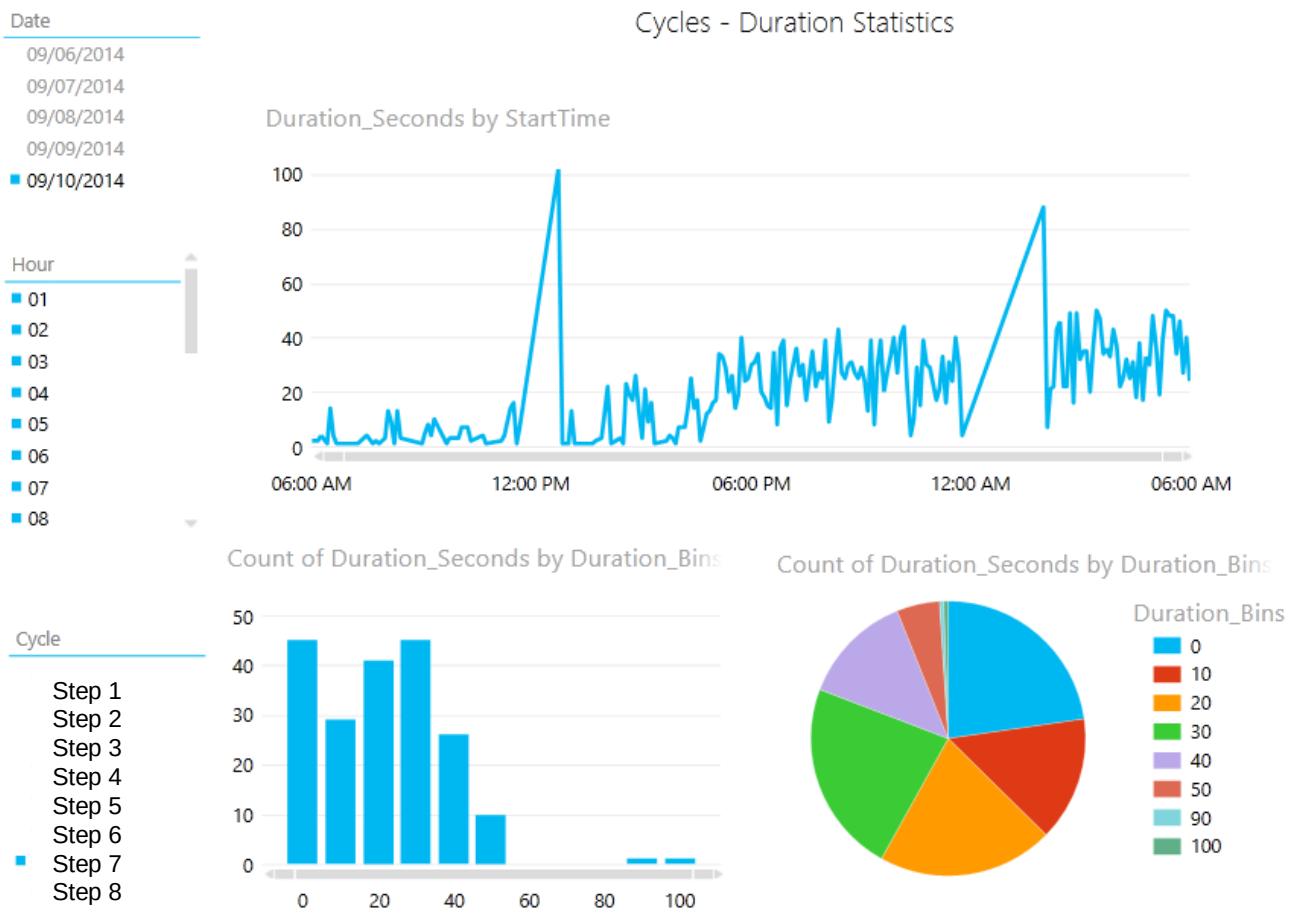
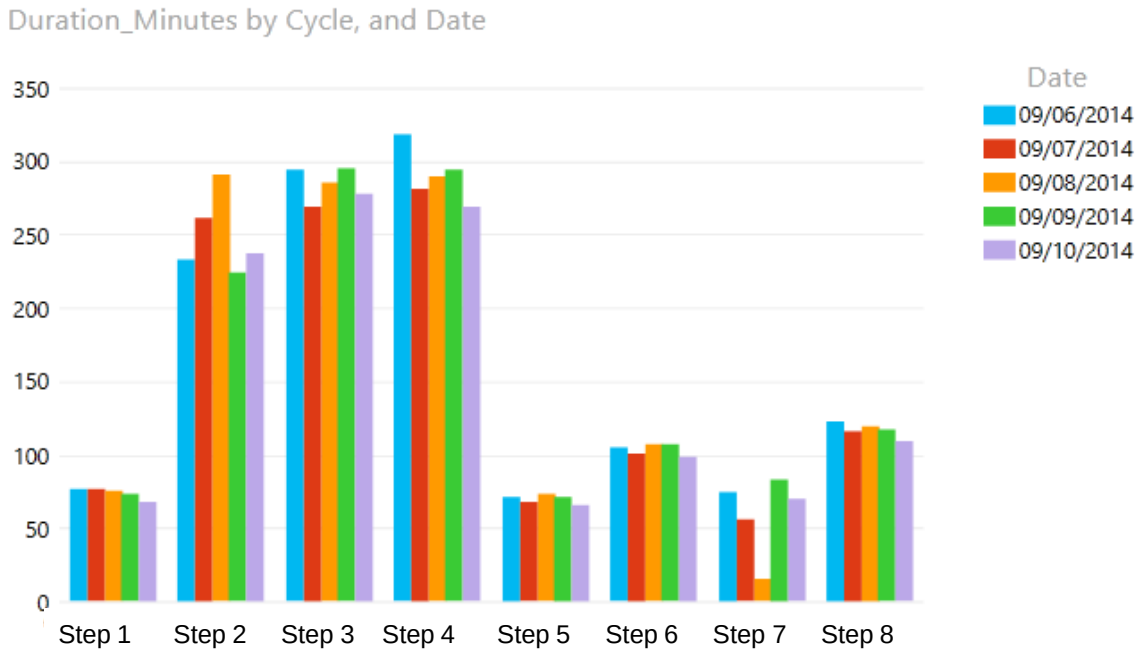


# Cycles - Duration in Each Step

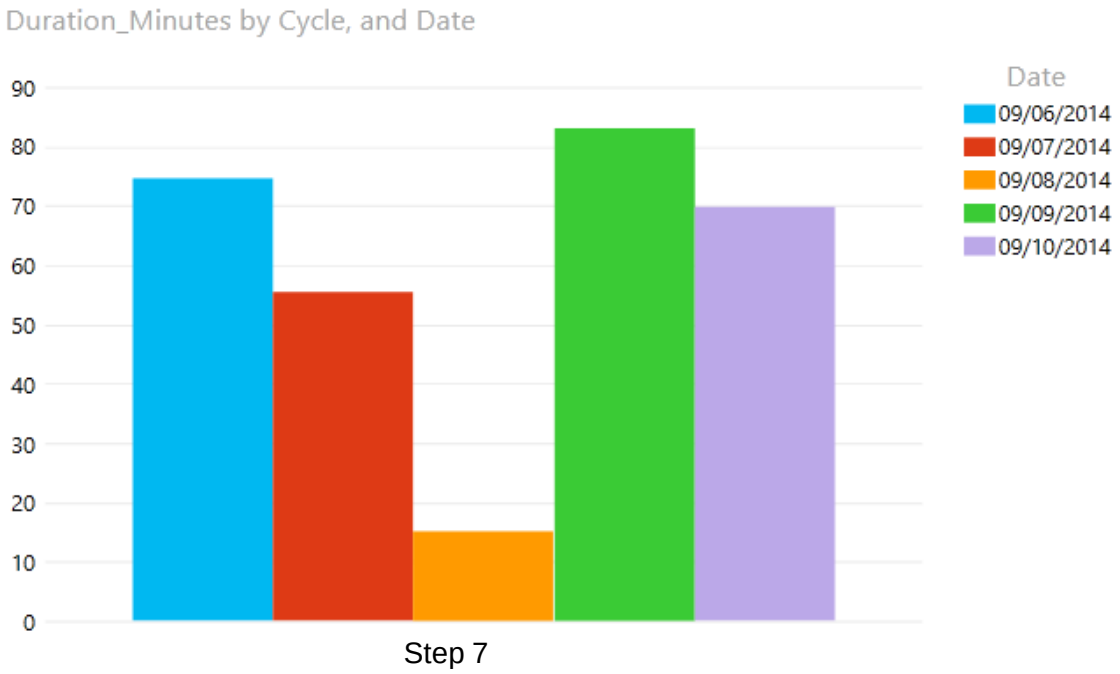
Date
- 09/06/2014
- 09/07/2014
- 09/08/2014
- 09/09/2014
- 09/10/2014



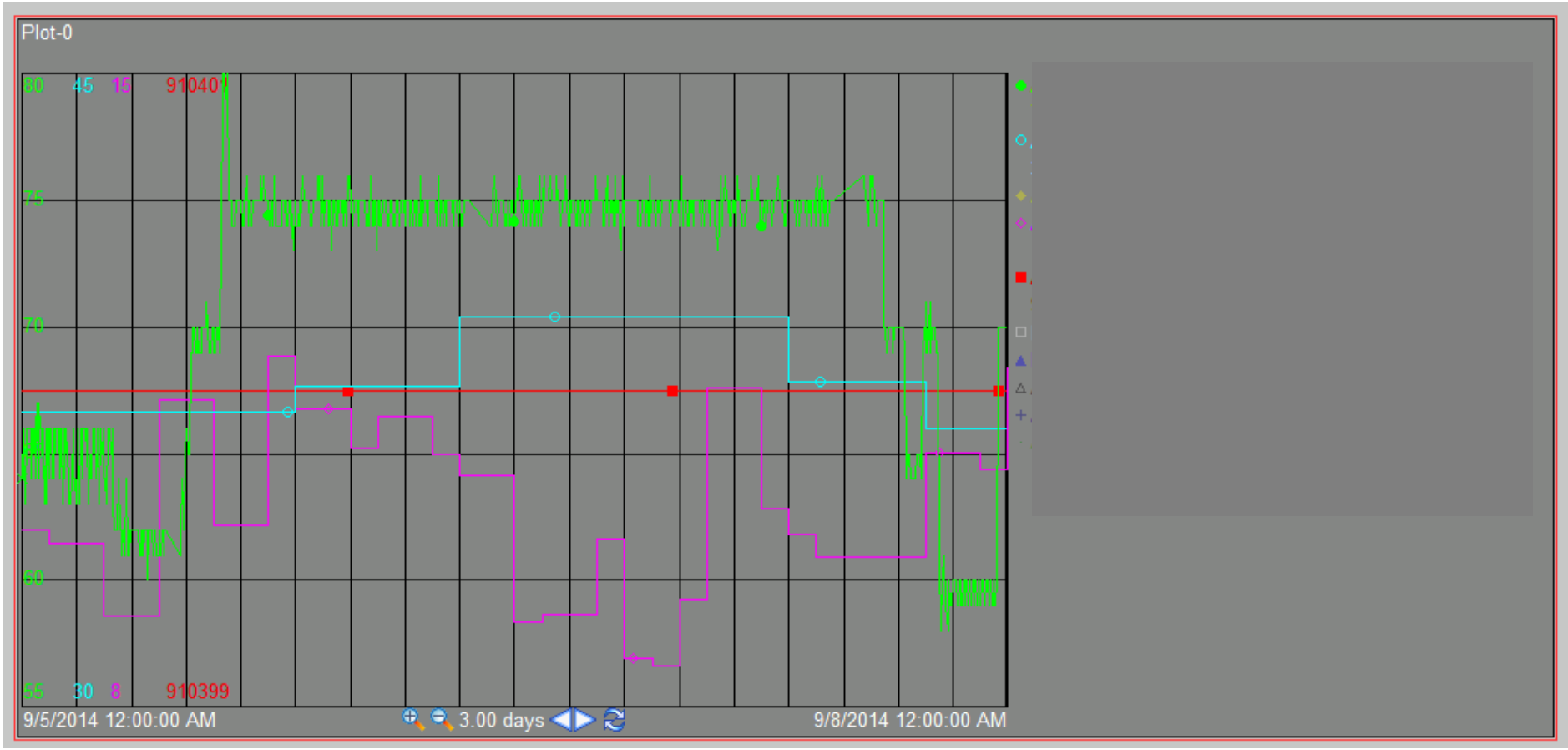

Cycle
- Step 1
- Step 2
- Step 3
- Step 4
- Step 5
- Step 6
- Step 7
- Step 8

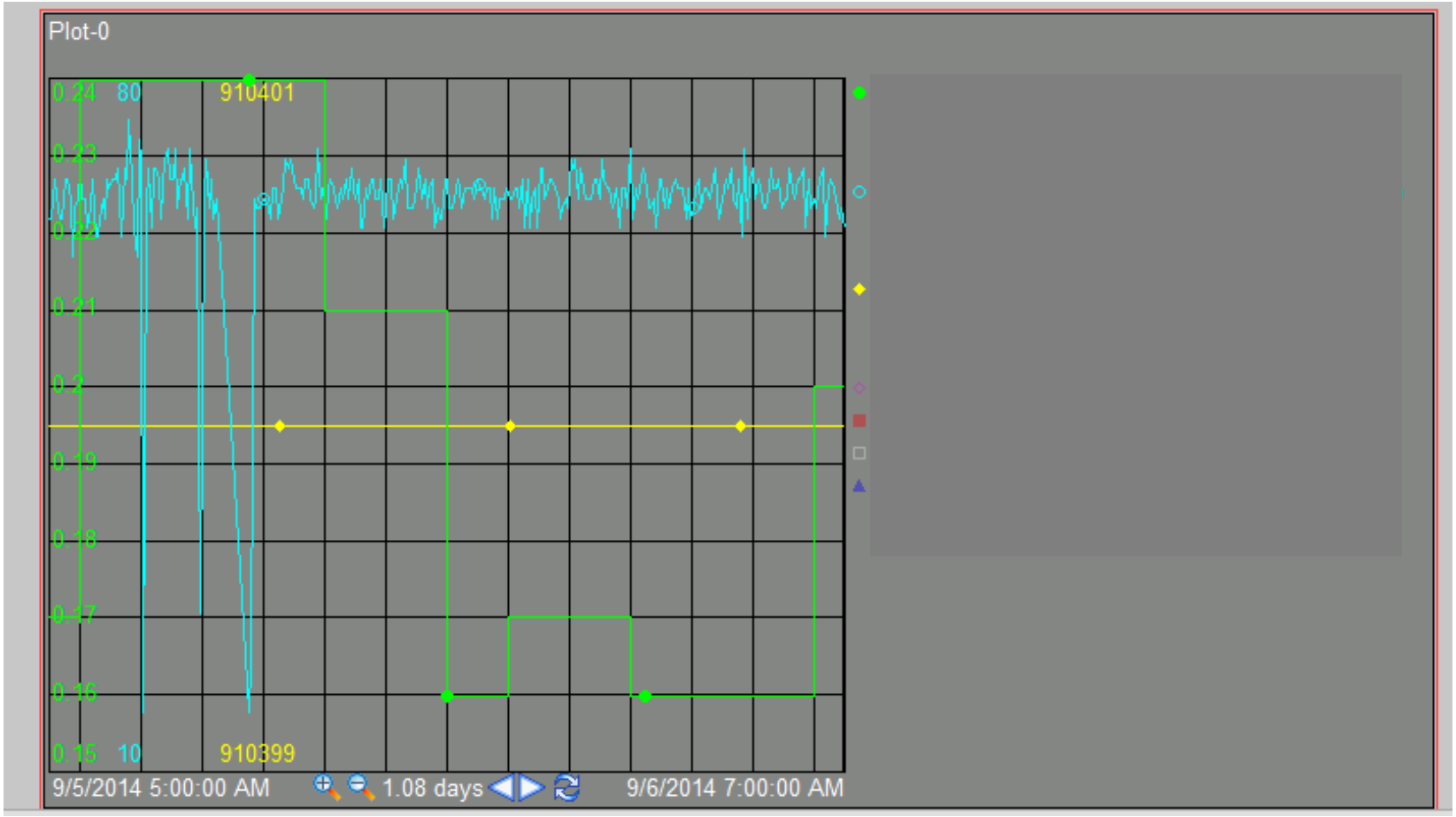
# Cycles - Duration in Each Step

Date
- 09/06/2014
- 09/07/2014
- 09/08/2014
- 09/09/2014
- 09/10/2014

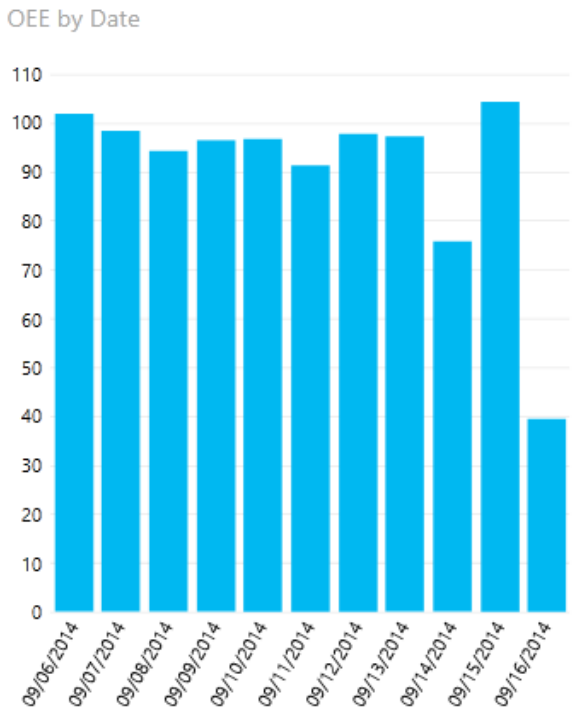



Cycle
- Step 1
- Step 2
- Step 3
- Step 4
- Step 5
- Step 6
- Step 7
- Step 8





# Daily OEE (Target=23 Hours)



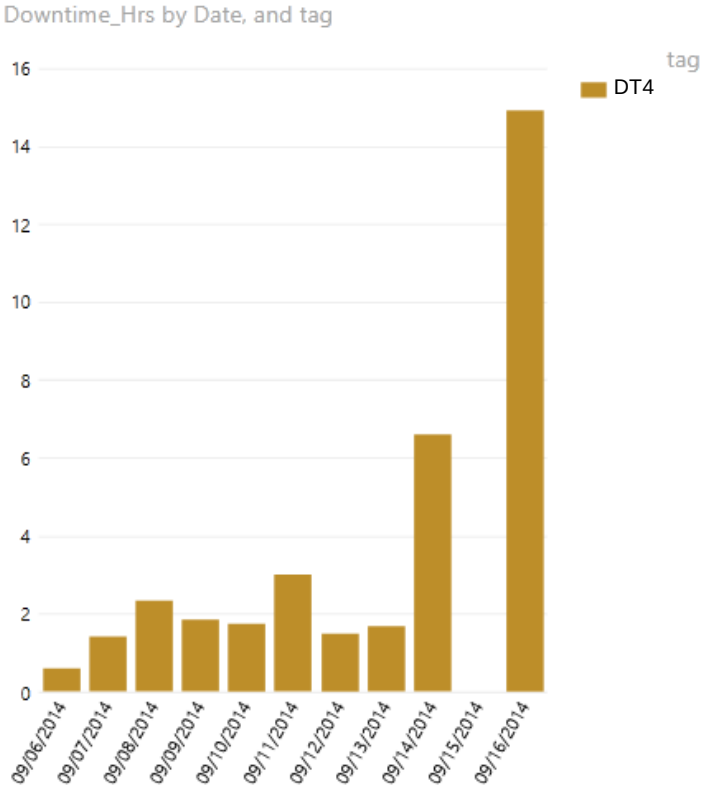
# Downtime Hours (6am to 6am)

Item

- DT1
- DT2
- DT3
- DT4

Date

- 09/06/2014
- 09/07/2014
- 09/08/2014
- 09/09/2014
- 09/10/2014
- 09/11/2014
- 09/12/2014
- 09/13/2014
- 09/14/2014
- 09/15/2014
- 09/16/2014



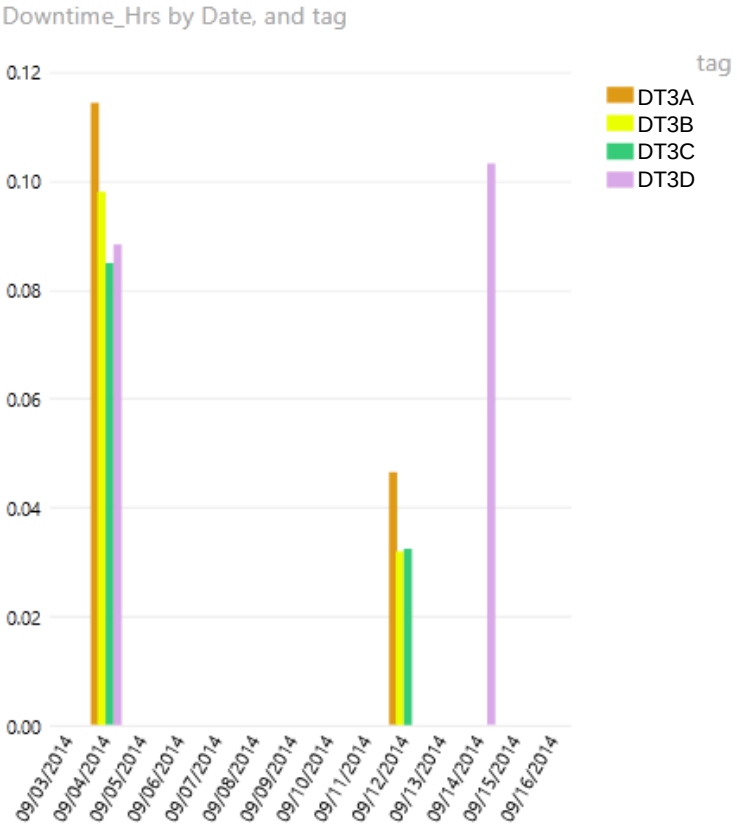
# Downtime Hours (6am to 6am)

Item

- DT1
- DT2
- DT3
- DT4

Date

- 09/03/2014
- 09/04/2014
- 09/05/2014
- 09/06/2014
- 09/07/2014
- 09/08/2014
- 09/09/2014
- 09/10/2014
- 09/11/2014
- 09/12/2014
- 09/13/2014
- 09/14/2014
- 09/15/2014
- 09/16/2014



**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

**From:** DoNotReply@PINotif.com [mailto:DoNotReply@PINotif.com]
**Sent:** Thursday, September 25, 2014 8:00 AM
**To:** [redacted]
**Subject:** Maintenance] generated a new notification event.

**Name:** Daily Maintenance
**Trigger Time:** 9/25/2014 7:00:00 AM Central Daylight Time (GMT-05:00:00)
**Target:** **Batch Operation**

**Batch Downtime (6 am to 6 am):**

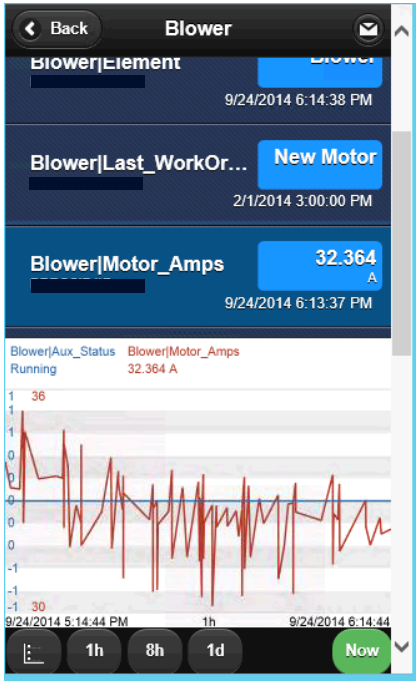
**B1** : 0 min
**B2** : 0 min
**B3** : 73.38995 min

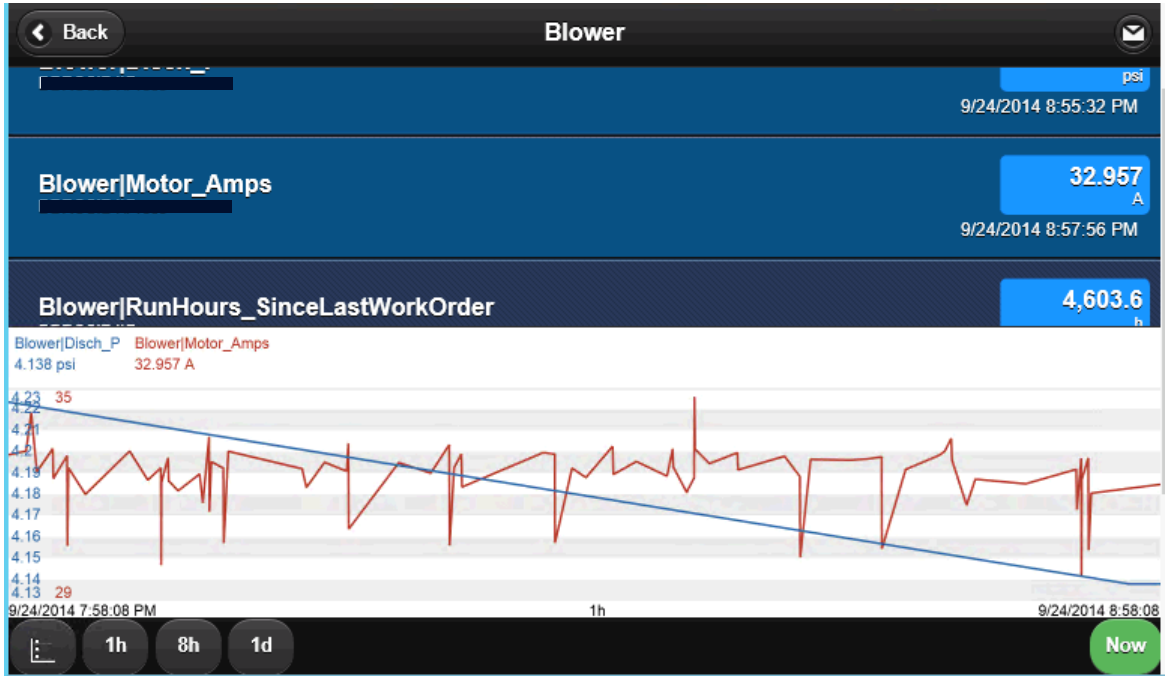
**DT 24hr (6 am to 6 am):**

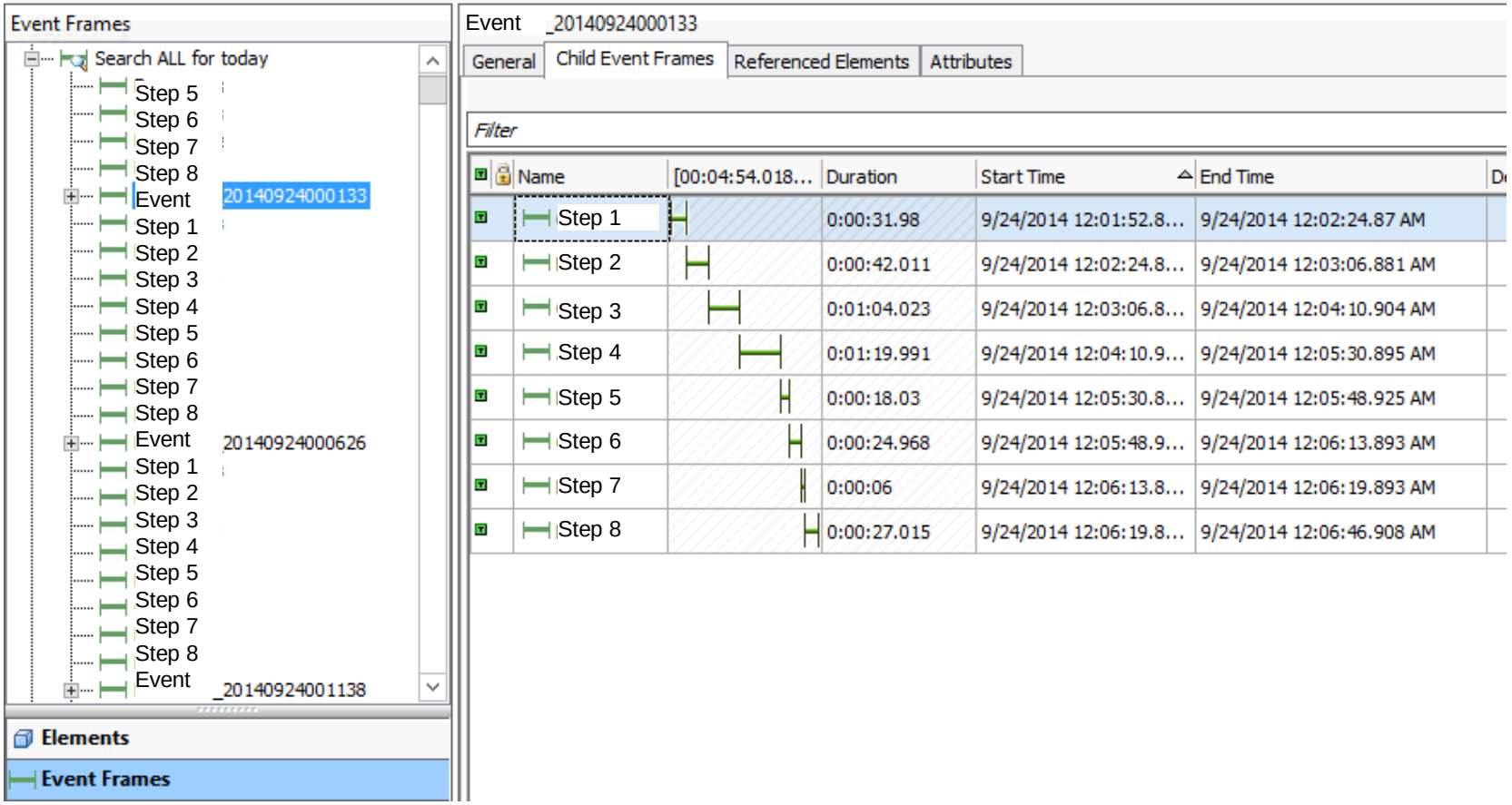
**DT3A** : 0 min
**DT3B** : 0 min

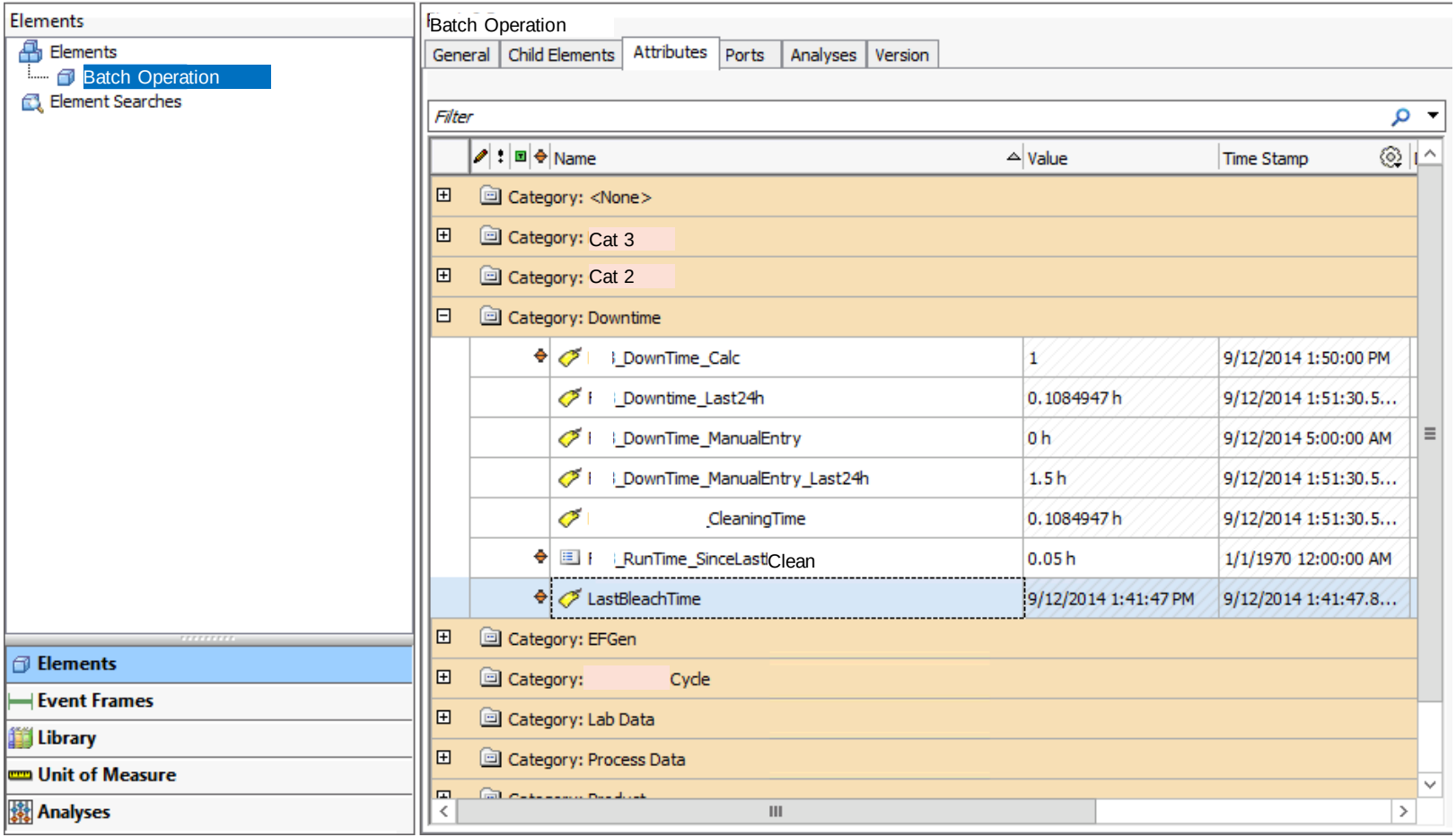
**Blower**

Blower Run Hours Since Last WO : 4627.563 Hours
Blower Number of Starts since Last WO : 87 Count



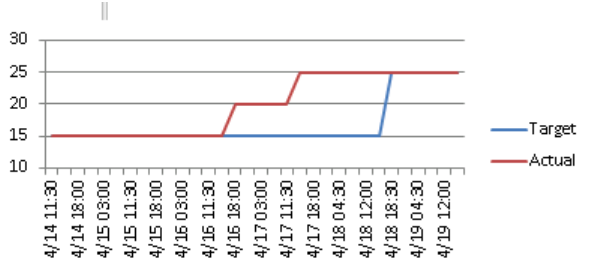



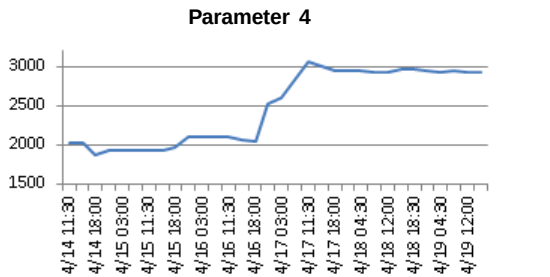


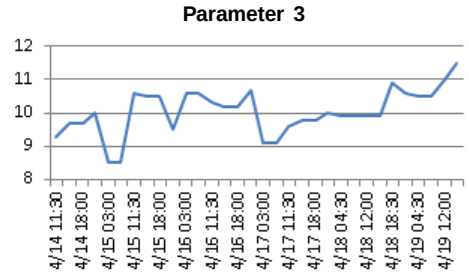


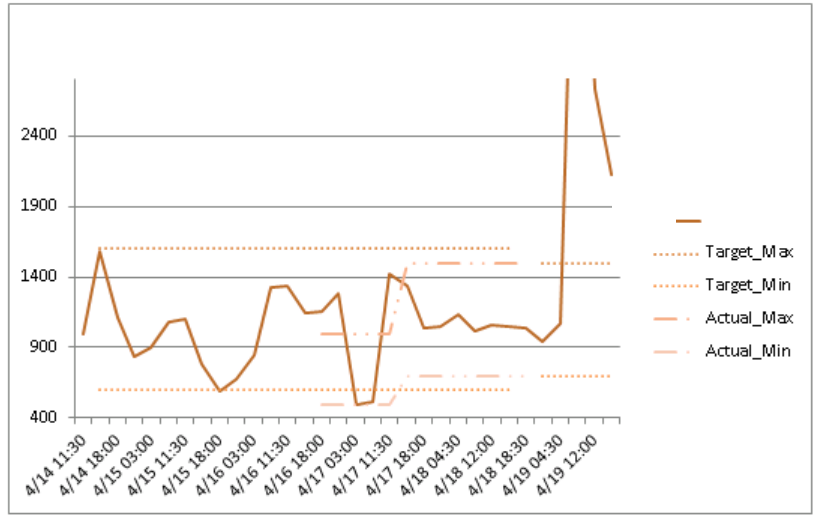
# Product ABC – pH,

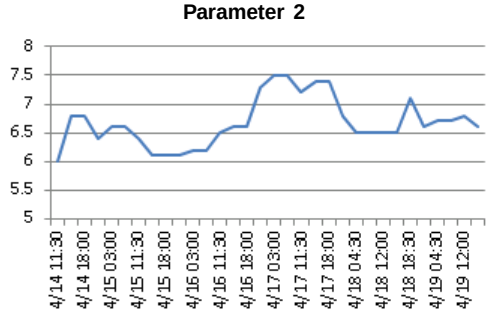
| Month | Day | Parameter 1 | Parameter 2 | Parameter 3 | Target | Actual |
|---|---|---|---|---|---|---|
| 4 | 14 | 0.14 | 6.0 | 10 | 15 | 15 |
| | 15 | 0.16 | 6.5 | 11 | 25 | 20 |
| | 16 | 0.18 | 7.0 | 8 | | 25 |
| | 17 | 0.20 | 7.5 | 9 | | |
| | 18 | | | | | |
| | 19 | | | | | |

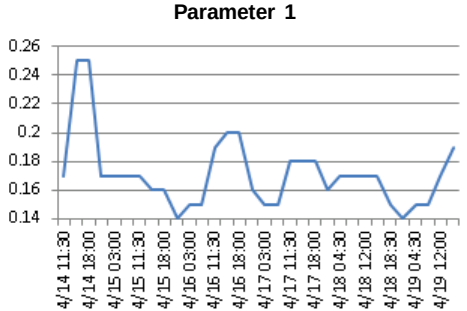


# New Tools Used

- PI System Explorer
  - Created new databases for plants
- Asset Framework
  - Created Templates
  - Created Analysis
  - Created a new UOM
  - Create lookup table
- Event Frame Generator
- Event Frames
  - Create new EF Template and replicated to 3 additional units
- Notifications
  - Added Contacts
- Coresight

# Project Results

- Within 2 weeks of presenting the data to operations, production has increased by 7%, and we have not even addressed step 2 and step 3 analysis yet!
- We were able to calculate the additional energy needed for the production increase and verify the any constraint.
- Downtime is automatically calculated
- Critical KPI's are received daily
- The increase was achieved with no additional equipment.
- Calculated revenue increase between $300,000 and $500,000 annually
  - We have 15 of these units across the company!

- Since completing this project
  - We have attached our development server to other PI servers to give the local admins a hands on lab to work with
  - Created daily and monthly inventory notifications to critical buyers
    - Created a Tank template to calculation levels, using raw and scaled values – used at multiple sites
  - Applied the batch template to 3 additional operations for analysis, in less than 3 days.

- With these results in hand, we have quantifiable proof to share with critical stakeholders in the organization.

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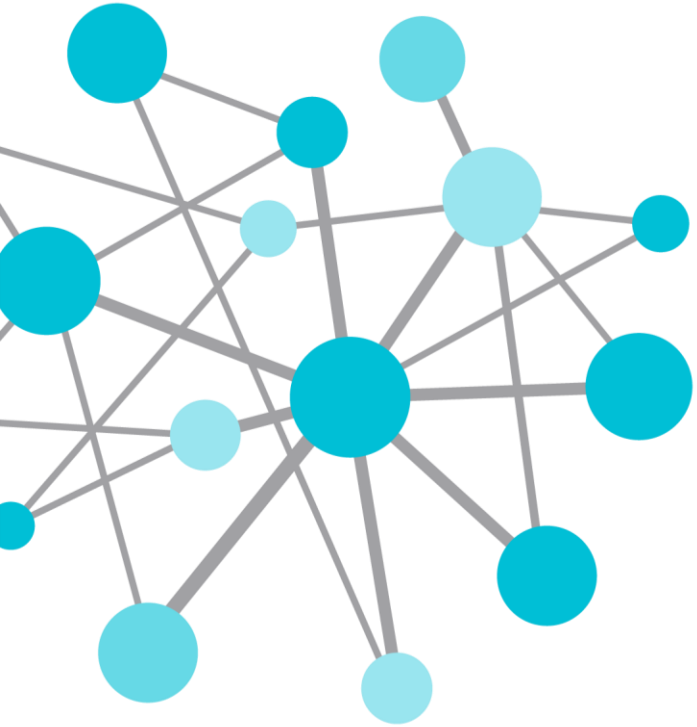

# THANK YOU

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