PI@DowCorning.com
PI Tools Lead to Plant Profits

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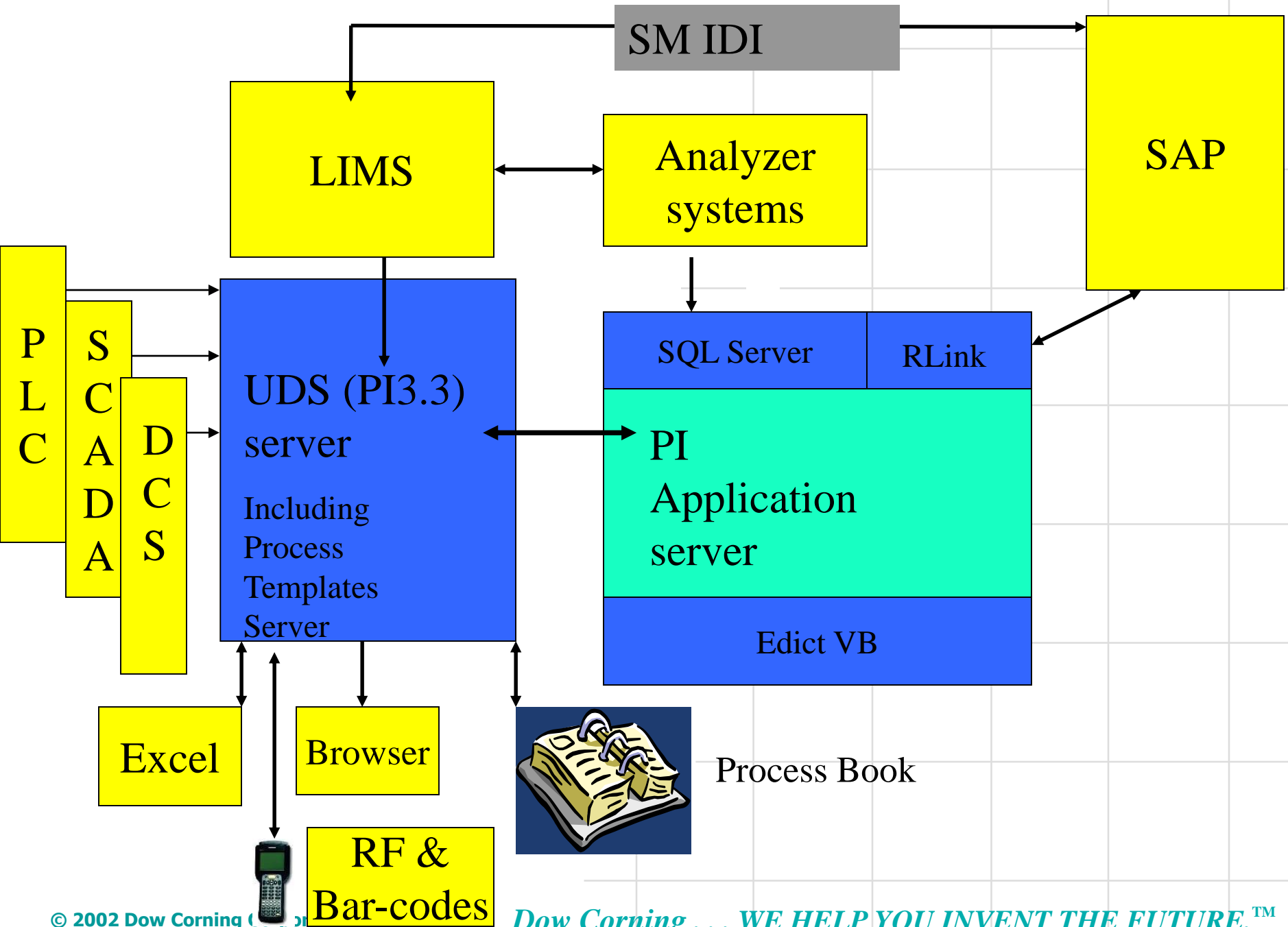
Dow Corning Profile

- 2001 Sales: 2.44 Billion
- Employees: 7500 globally
- Manufacture of Silicon based chemicals
- Significant softwares
  - OSI Soft PI tools including RLink
  - SAP 4.6B – single instance globally
  - Sample Manager LIMS
  - Web based bar-coding interface to PI and SAP
  - Various Control Systems (one of everything)

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OSI Soft in Use at Dow Corning

- First PI system in 1992 – VMS based PI 1.X
- Interfaces – Sixteen, including Dow Corning written
- UDS/Edict (PI3.3)– 14 sites with 18 servers, 250,000 tags
- PI Batch – 200 batch units
- Process Template SPC – 35 implementations
- Process Book & Excel Add-in – 700 clients
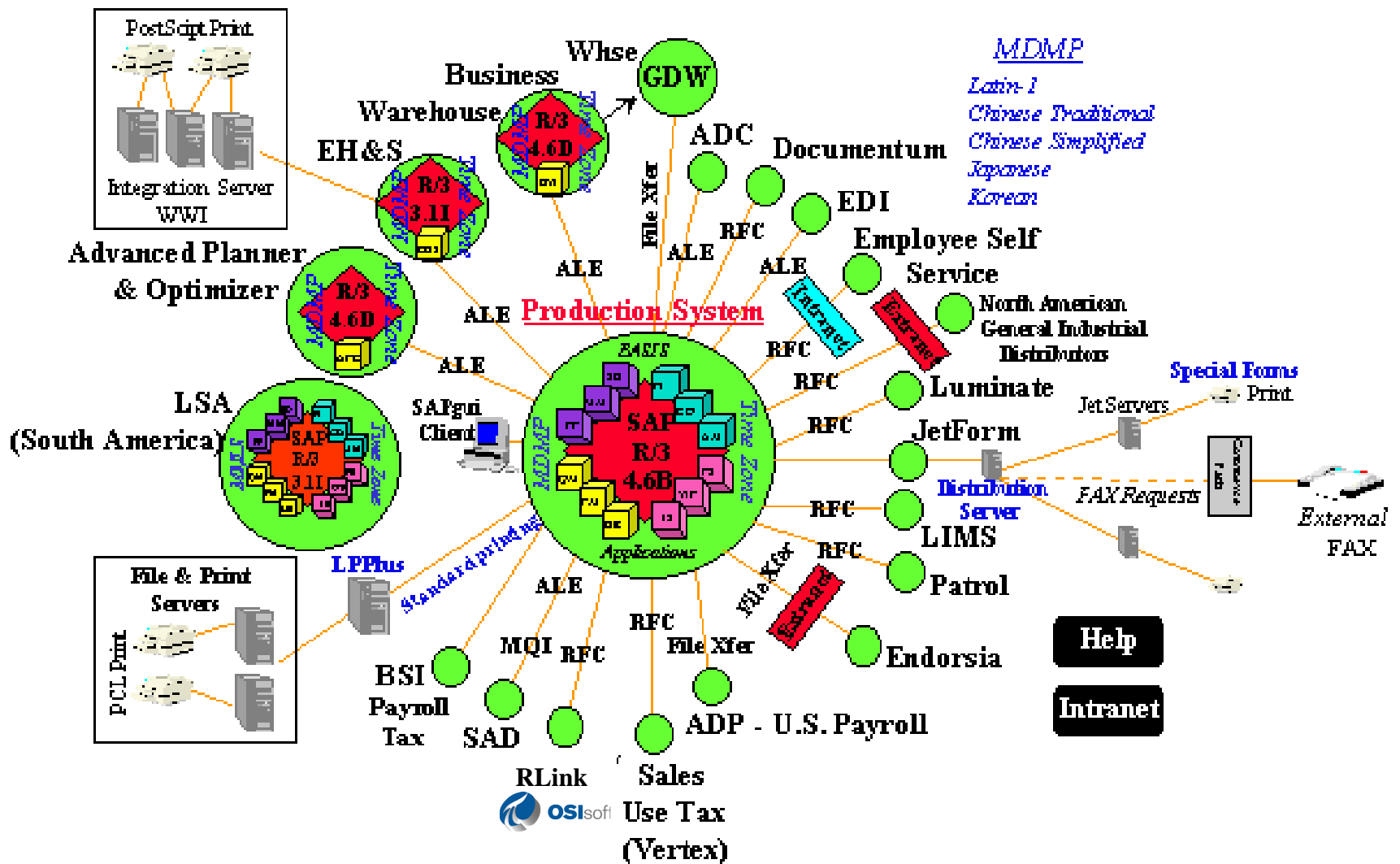- RLink PM & PP/PI– 22 implementations at 3 sites

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Current PI Server Locations

Midland, Michigan

Carrollton Kentucky

Barry Wales

Seneffe Belgium

Manseung Korea

Chiba, Japan

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SM IDI

LIMS

Analyzer systems

SAP

PLC

SCADA

DCS

UDS (PI3.3) server

Including Process Templates Server

SQL Server | RLink

PI Application server

Edict VB

Excel

Browser

Process Book

RF & Bar-codes

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Industry Types within DC

- Process
  - Batch
  - Continuous
  - Semi-continuous
- Discrete
  - Packaging
  - Robotics

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Process Controller Interfaces

- Fischer & Porter / Bailey

- Allen Bradley PLC

- Siemens PLC

- Intellution SCADA

- Foxboro I/A

- Fisher/Rosemont Delta V

- Batch Execution Systems (Batch Engines)

- Radio Frequency and Bar-coding for manual data entry

- PC based manual data entry

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SAP Architecture

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SAP Modules

- PP
- PS
- APO
- MM
- SD
- WF

- PP/PI
- QM
- BW
- WM
- CO
- IS

- PM
- FI
- HR
- CRM
- AM

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PI Specifics – Presentation Agenda

- Rlink
  - PP/PI
  - PM
- PI Process Templates SPC
- PI analytics
- Mass Balance
- PI for IT

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RLink

- 22 Implementations – globally
  - PM – 2
  - PP/PI – 20
- Provided PM RLink implementation and follow up consulting to the mining operations at BHP Escondida in Chile - Cedric Luyt presentation

Kris reviewed our SAP-RLink-PI configuration and stabilised its operation. It had been operating but with the generation of some errors. He also reviewed R-Link behaviour when SAP and/or PI were down and fed the results to Osisoft to review. He carried out training for our system support people as well as for the Chilean Osisoft personnel.

Joe Garcia, project manager at BHP in Escondida

RLink Specifics – PP/PI

- 5 Batch processes
  - Tank Truck inventory
  - Batch Mixers – manual data entry
- 15 continuous processes
  - Reactors
  - Storage tanks
  - Meters

RLink Specifics – PP/PI

- SAP Transactions
  - Consumption (GI)
  - Production (GR)
  - Inventory movements (MM)
  - Order confirmations
    - Partial
    - Full
  - Resource confirmation

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RLink Specifics – PP/PI

- Automated Calculations – eliminate human intervention
  - Mass balance
  - Data reconciliation
  - Unit conversion
  - Status testing
  - Temperature compensated volume to mass conversions

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RLink Example(s)

RLink Key Information

Plant 0052 | Plant 0176

STC 4006576 — Auto Input Component — 2/26/2002 10:00:00 AM 26667.88 → **Cabot Mix Tank** → Auto Input Component — 2/26/2002 10:00:00 AM 26667.88 — By-Product → **STC 1679864**

TCS 1958640 — Auto Input Component — 2/26/2002 10:00:00 AM 11428.83 → **Cabot Mix Tank** → Auto Input Component — 2/26/2002 10:00:00 AM 11428.83 — Product → **TCS 1958640**

MeTCS 2455889 — Auto Input Component — 2/26/2002 10:00:00 AM 16327.22 → Auto Input Component — 2/26/2002 10:00:00 AM 16327.22 — By-Product → **MeTCS 2969751**

Click on the block above for Integration Spec

Active Recipe

Control Recipe	100000000000122989
Process Order	000101357180
PO Description	502,4000213,BLEND,BULK,KET20841-RLINK
Material	000000000004000213
Status @ Time	0 @ 2/25/2002 2:54:34 PM
Planned Start Time	2/25/2002 10:00:00 AM
Planned Finish Time	3/4/2002 10:00:00 AM
Plant	0052
Resource Network	KET20841
Building/Area	502
Process	Cabot Mix Tank

Get RLink Details **Get Previous Values**

Other Related Key Tags

Current SAP Inventory for STC (4006576)   2/26/2002 11:25:00 AM 12585.41 KG
Current SAP Inventory for TCS (1958640)   2/26/2002 11:25:00 AM 109086.49 KG

SAP Inventories
3.E+05
2.E+05
1.5E+05
1.E+05
0
2/19/2002 11:10:40 AM   7.00 Day(s)   2/26/2002 11:10:40 AM
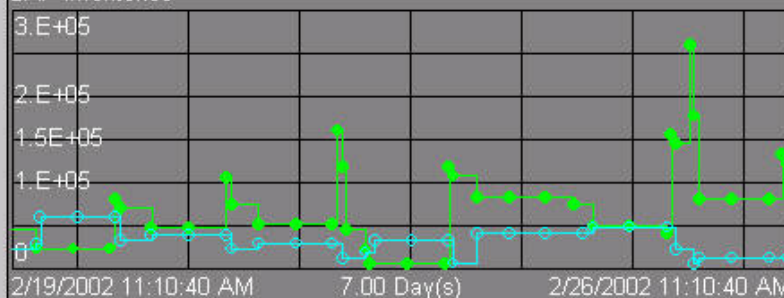
Default Server: CTNTPI3 PI Version: PI 3.3 Build: 361.50 Domain User: BJSOWER

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RLink Example(s)

RLink Example(s)

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RLink Example(s)

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RLink Specifics - PM

- Other Dow Corning Presentation by Bryan Sower

- Process monitoring
  - Both Batch and Continuous
  - Equipment/machine service hours
  - On/off Cycles
  - Run times
  - Threshold calculations

RLink Specifics - PM

- SAP Transactions
  - Automated PM Notifications
  - Measurement document creation
  - Automated measures
    - Overall Equipment Effectiveness (OEE)
    - Total Effective Equipment Productivity (TEEP)

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Summary Analysis | Detail listing

```
REPORT #: ZPM00042              DOW CORNING CORPORATION                PAGE#      1
RUN DATE: 10/03/2001            PM strategic measure of TEEP / OEE
RUN TIME: 15:42:36
                                Period - from  01/2001  to  12/2001


                                Functional Location :   0054-5205
```

Period	TEEP(%)	OEE(%)	PR(%)	AR(%)	ER(%)	QR(%)	Actual Cost	Unit	#Error
01/2001	50.29	50.29	100.00	96.00	52.39	100.00	41,364.83	USD	0
02/2001	77.92	77.92	100.00	99.14	78.60	100.00	61,466.06	USD	0
03/2001	62.32	62.32	100.00	80.94	76.99	100.00	97,279.76	USD	0
04/2001	75.16	75.16	100.00	92.02	81.68	100.00	62,498.55	USD	0
05/2001	78.60	78.60	100.00	100.00	78.60	100.00	28,436.61	USD	0
06/2001	73.87	73.87	100.00	100.00	73.87	100.00	20,575.47	USD	0
07/2001	66.92	66.92	100.00	98.78	74.55	90.88	30,144.72	USD	0
08/2001	83.92	83.92	100.00	100.00	83.92	100.00	34,176.41	USD	0
09/2001	100.00	100.00	100.00	100.00	100.00	100.00	32,532.43	USD	0
10/2001	100.00	100.00	100.00	100.00	100.00	100.00	362.32	USD	0
11/2001	100.00	100.00	100.00	100.00	100.00	100.00	0.00	USD	0
12/2001	100.00	100.00	100.00	100.00	100.00	100.00	0.00	USD	0

PI Process Templates SPC

- Concepts
  - "3D SPC"
  - Value of concept
- Software
- Dow Corning's Implementation
  - Wrote original – 8 years ago
  - Exele Version now in 3 sites globally

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Process Template Concepts

- A control Chart for every minute
  - Each point on the display has a control chart associated with it
  - Drilldown to specific chart via the point on the template
- Combine the limits and center line into a "trend"
- Plot the current batch in real time on this trend

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Template Manager

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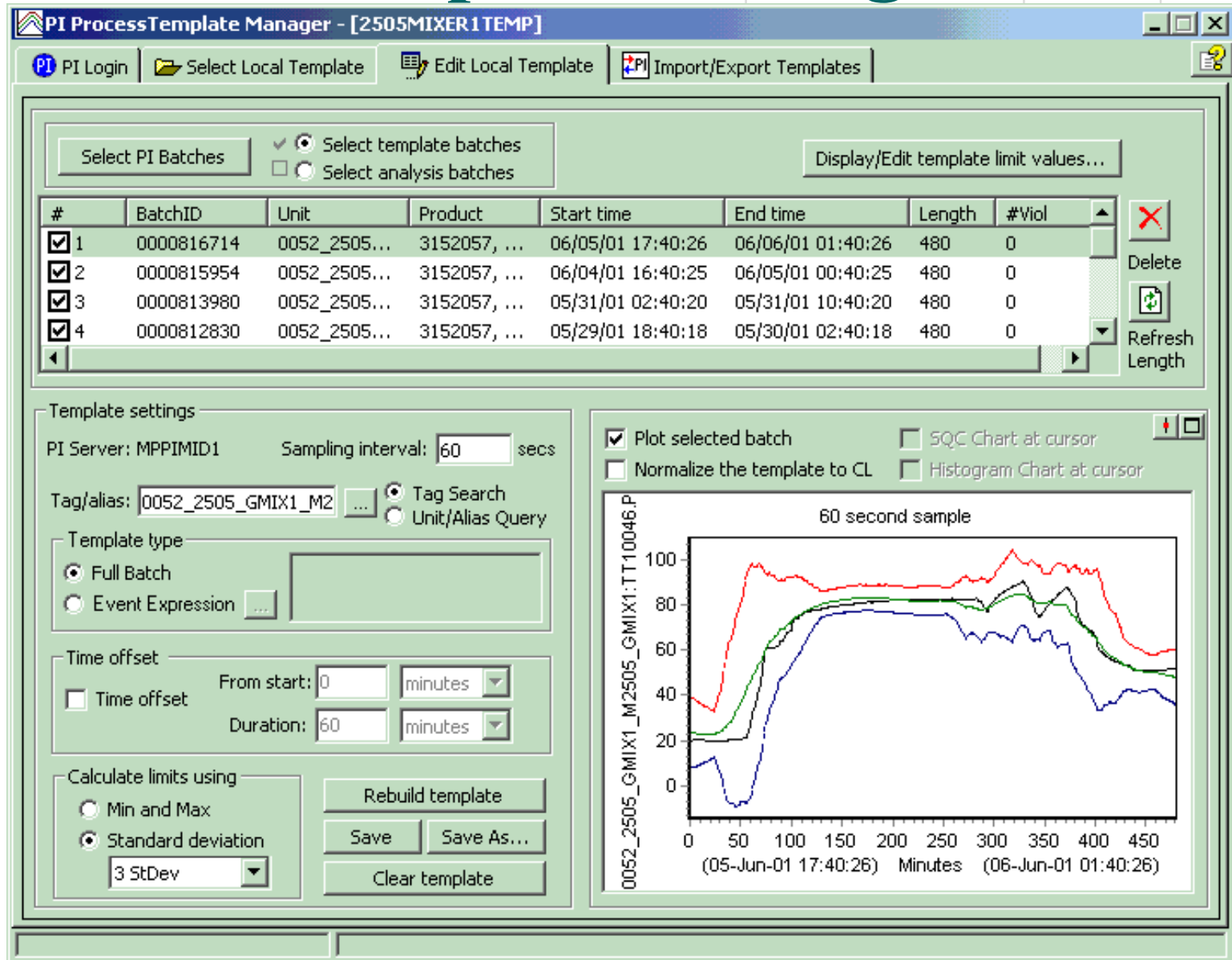
Historical Template
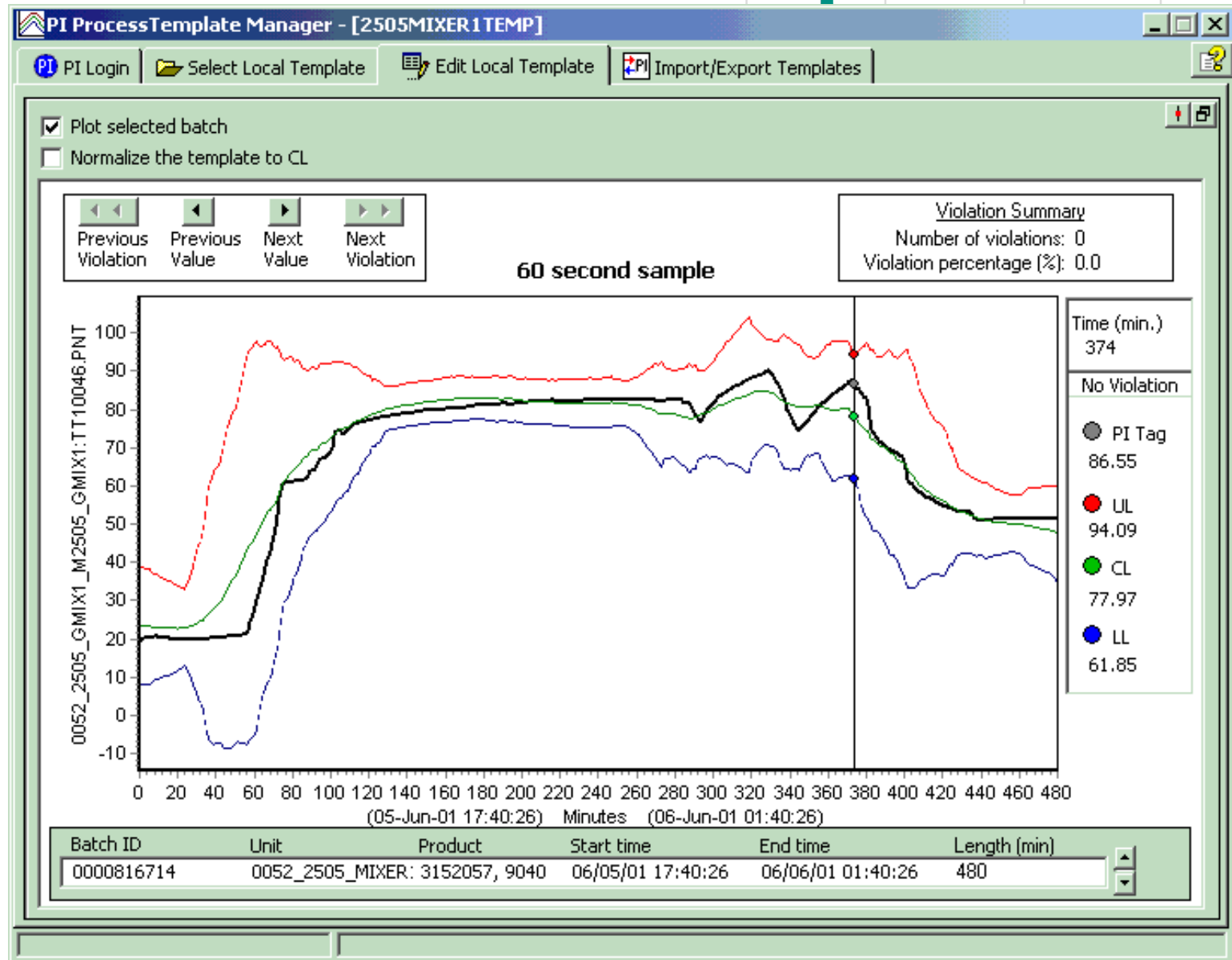
Specific Control Chart
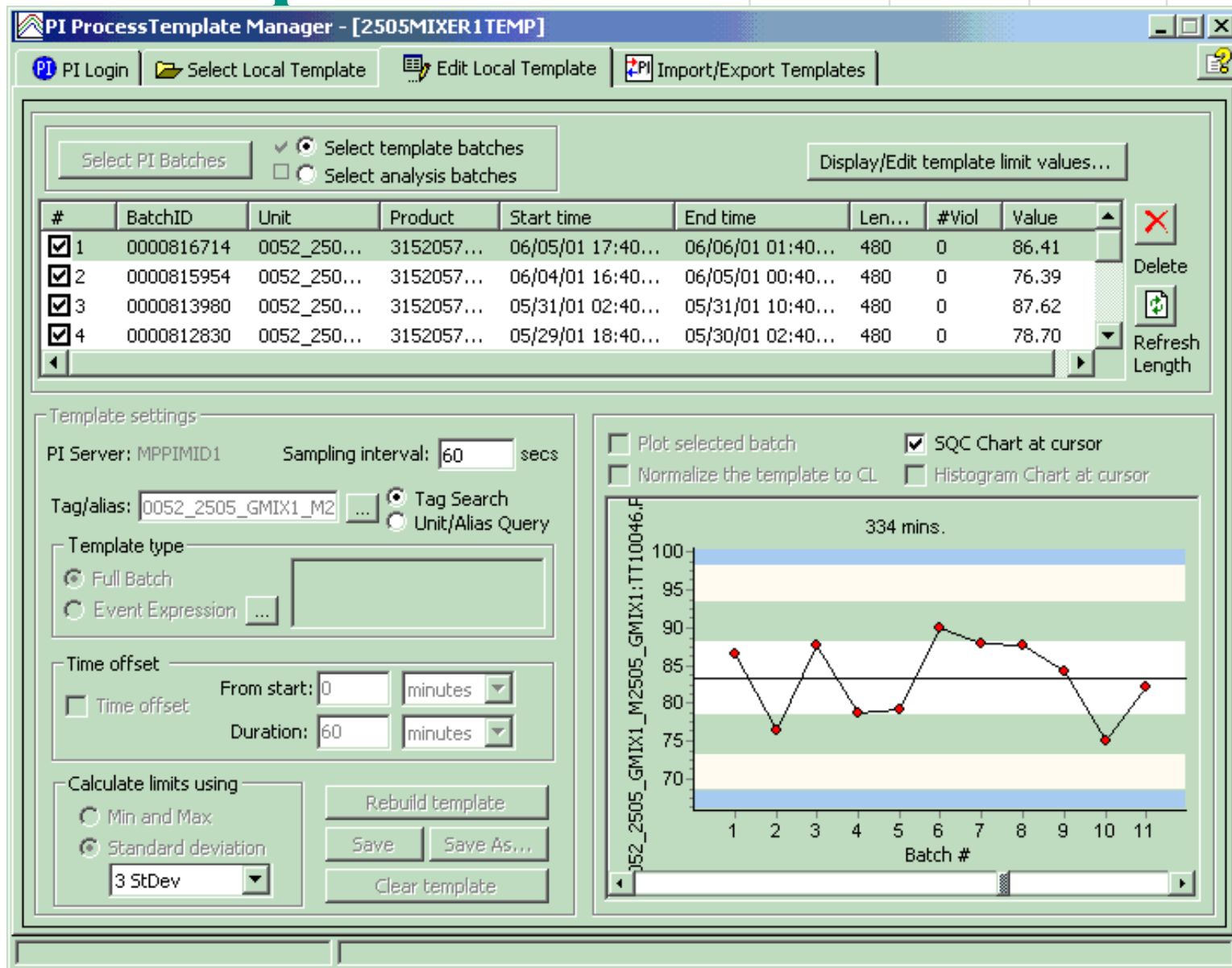
Specific Histogram
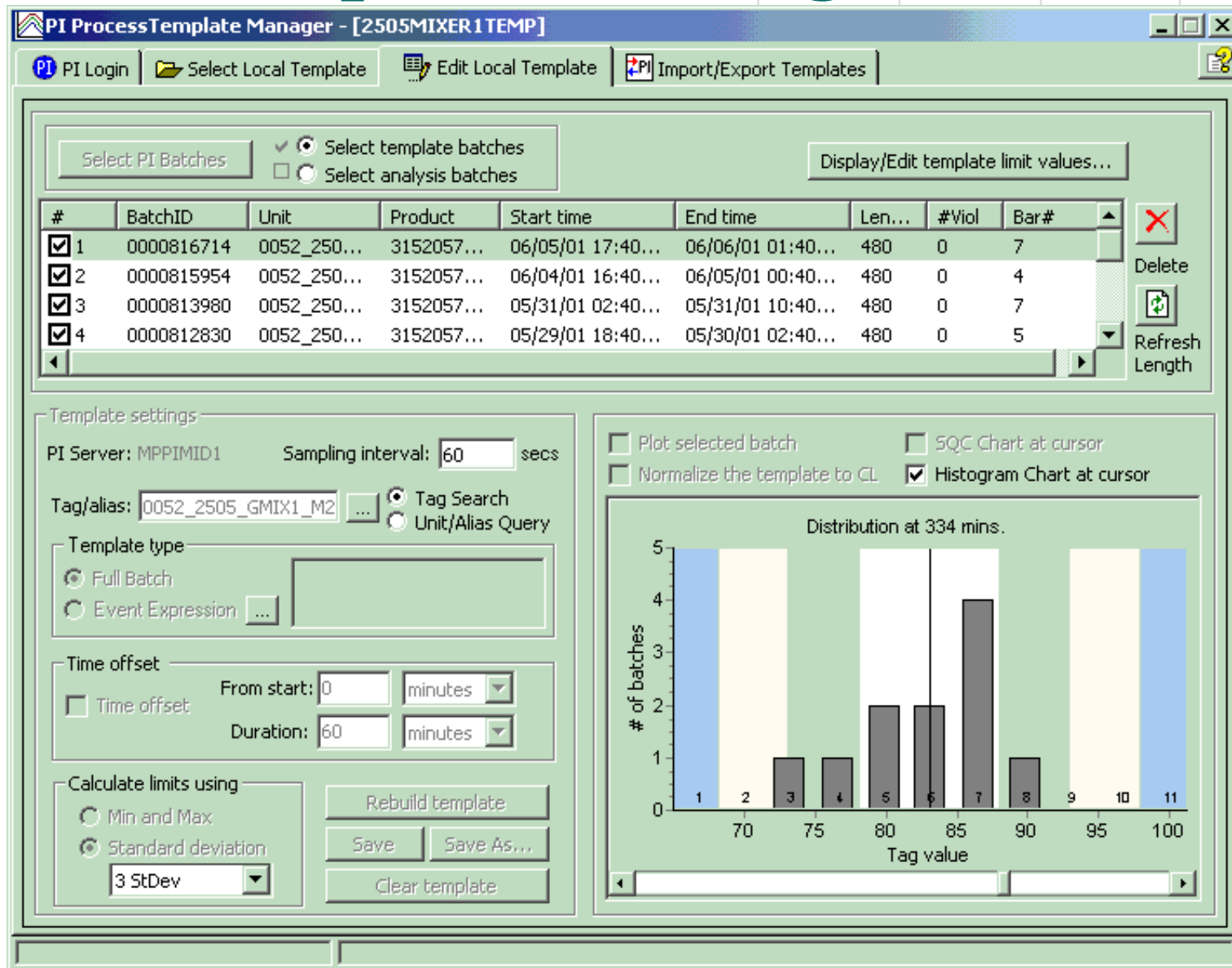
Real-time Monitoring
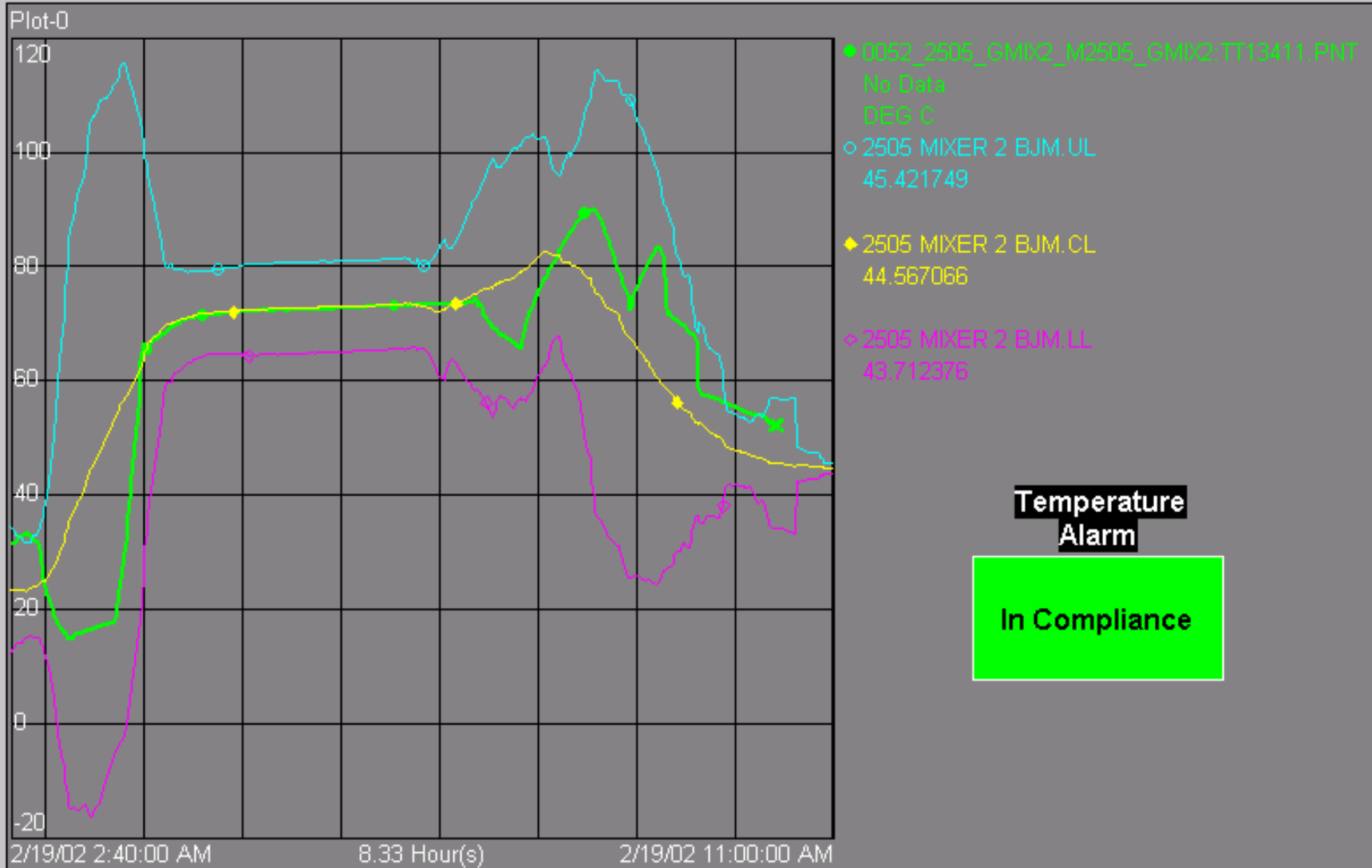
PI Analytics

- PI SQC
  - Continuous Processes
  - Batch Process
  - QA data (LIMS data in PI)
- Process Book and VB
  - Active X Container
  - Multiple data sources
- Data Link – Excel
  - Primary analytical tool
  - User flexibility
- Exele – Edict VB

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PI for IT

- Provisions
  - Historical views of instantaneous measures
  - Detection of cumulative problems (memory leaks)
  - Alarming
  - Diagnostics
- OSI Software provided
  - PI – PerfMon
  - PI – SMTP Monitor
  - PI - Ping

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PI for IT

- Monitored Servers
  - PI Servers (included with UDS 3.3)
  - MS Exchange Servers
  - SCADA
  - MS SQL
- Monitored NT Statistics
  - Memory
  - Disk
  - CPU
  - Specified Processes

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PI for IT

- Network Monitoring – 4000 tags
  - Ping Time
  - SNMP Response Time
  - Dropped Packets
  - Router health calculations

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Mass Balance

- PI data on tank levels
- PI data on inventory meters
- Manual data entry into PI & Excel
- Data reconciled in Excel via Datalink
- SAP data into PI and Excel via IDOC and ALE
- Comparison between PI and SAP data
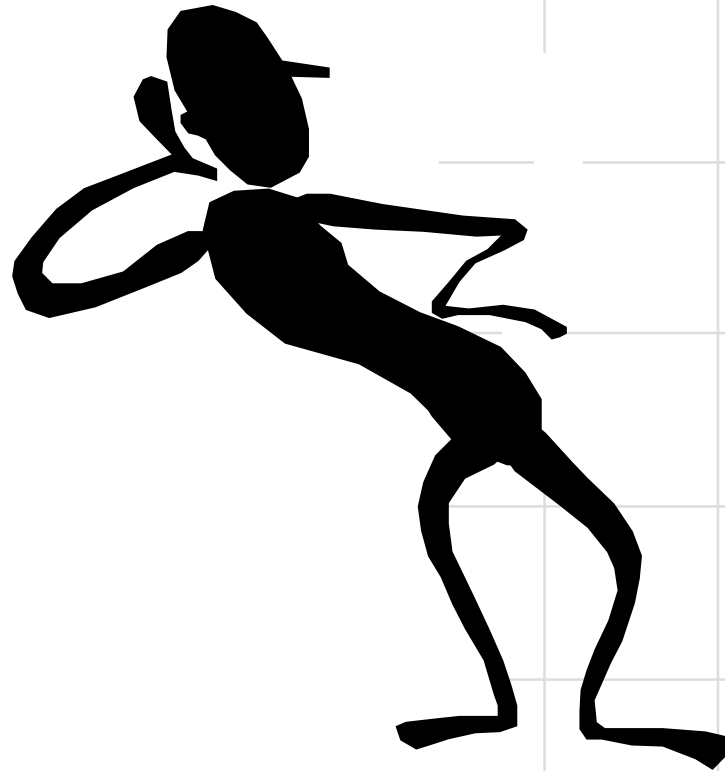- SAP "adjusted" to match PI (inventory transactions)

Plant Profits

- Estimated greater than 5,000,000 USD saved per annum with PI tools
  - At line recovery of batches
  - Data entry via RLink, not manual
  - Fewer data errors and corrections
  - Predictive Maintenance fewer unplanned shutdowns
  - Assignable causes determined more quickly
  - Etc.

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Summary

- UDS Servers
- Interfaces to PI
- Rlink interfaces to SAP
- Batch Monitoring
- PI Analytics
- PI for IT
- Inventory balancing
- Service Offerings
- Plant Profits

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Questions & Hopefully, Answers

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