Performance Management Turning Data Into Dollars

Presentation to OSISoft User's Conference
San Francisco Marriott
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Who is Millennium Chemicals?

Introduction / PIMS Opportunity

"Project" Scope & Progress to Date

The Positive Impact of PI

Plans Moving Forward

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Who is Millennium Chemicals?

Position (Share)

TiO_2 - Pigment for Paint, Paper, & Plastics

#2 in the world (16%)
#2 in the US (23%)

TiCl - for Metals/Alloys

#1 in the US

Acetyls - VAM, Acetic Acid, Methanol

#2 in the US (19%)

Equistar*
   Ethylene

#1 in the US (17%)

   Polyethylene

#2 in the US (15%)

Terpene-based
   fragrance & flavor chemicals
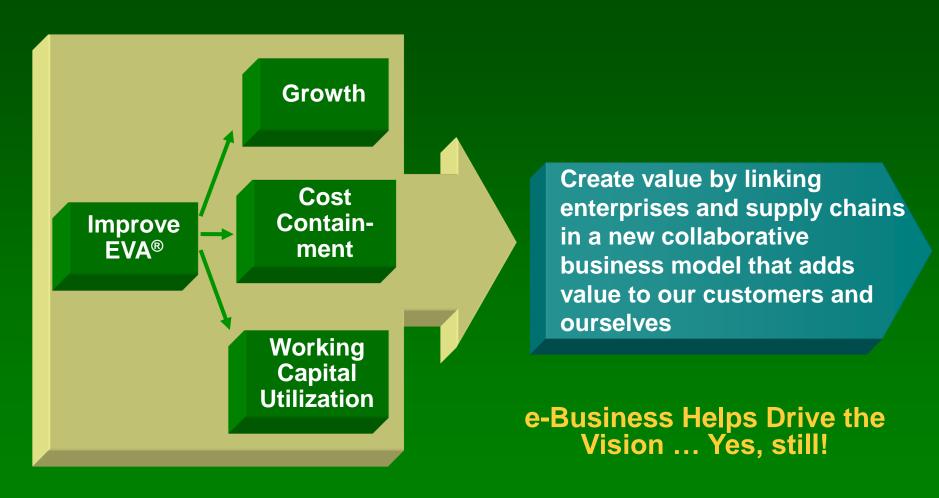
* **Joint Venture with Lyondell - 29.5% ownership by MCH**

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Where is Millennium Chemicals? *

Stallingborough, UK

Ashtabula, OH

LeHavre, Normandy

Baltimore, MD

Thann, Alsace

LaPorte, TX

Colonel's Island, GA

Jacksonville, FL

Mataraca, Paraiba

Salvador, Bahia

Perth, WA

Bunbury, WA

* Manufacturing Sites Only - Not Including EQUISTAR

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Millennium Chemicals e-Business Vision

Millennium Chemicals

- Improve EVA®
  - Growth
  - Cost Containment
  - Working Capital Utilization

Create value by linking enterprises and supply chains in a new collaborative business model that adds value to our customers and ourselves

e-Business Helps Drive the Vision … Yes, still!

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PIMS Opportunity: Importance to Process Control & Profitability

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What is PIMS?

PIMS:
(Plant Information Management System)
An integrated information system for acquiring, historizing, analyzing, and reporting real-time process information, quality information, costs, and plant production transactional information. An essential foundation for other MES & ERP functions.

"You can only improve upon what you see or measure …"
Dr. Edward Deming

More controversial but no less true: (based on numerous CPI experiences)

"Companies that have implemented ERP without addressing manufacturing systems and real-time plant information systems are forfeiting more than 50% additional ROI"

Gartner Group

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ERP:
(Enterprise Resource Planning)
An integrated information system for identifying and planning the resources needed to take, make, ship, and account for customer orders for an entire enterprise or company.

MES:
(Manufacturing Execution Systems)
Plant-level systems or real-time closed loop applications which deliver information, that enables the optimization of production activities from the release of an order to final completion. Typically includes: product tracking, genealogy, production/yield accounting, PIMS, modeling, resource & equipment scheduling, etc.

Process Control:
Many systems and diverse field equipment used to maintain any number of processes, at multiple plant sites, within capability limits to ensure that high quality products are produced safely and efficiently

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Enterprise-wide Information Integration
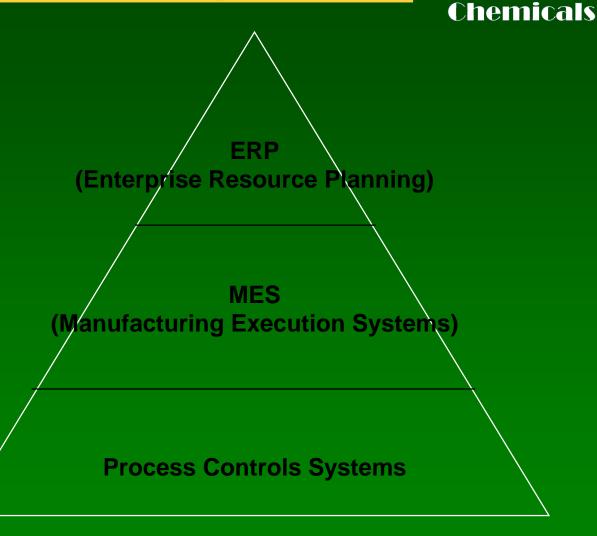
Command
(Business Decisions)

Coordination
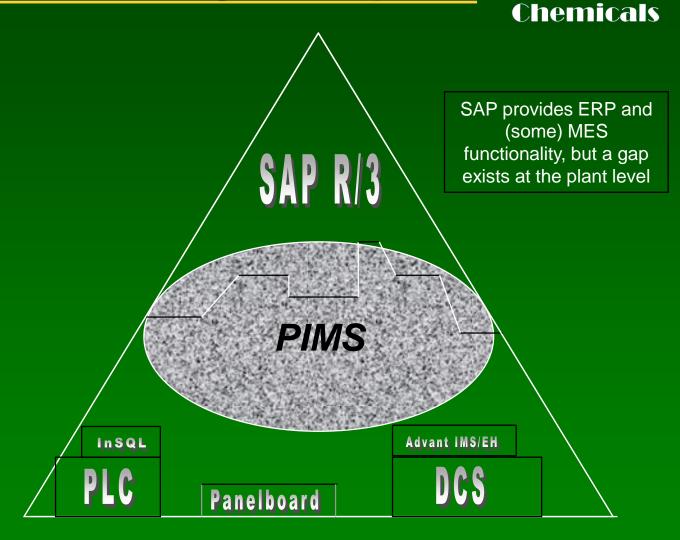(Plant Decisions)

Control
(Process/Line Decisions)

ERP
(Enterprise Resource Planning)

MES
(Manufacturing Execution Systems)

Process Controls Systems

NIST CIM Model

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A Simple View of MCH's Integration Gap

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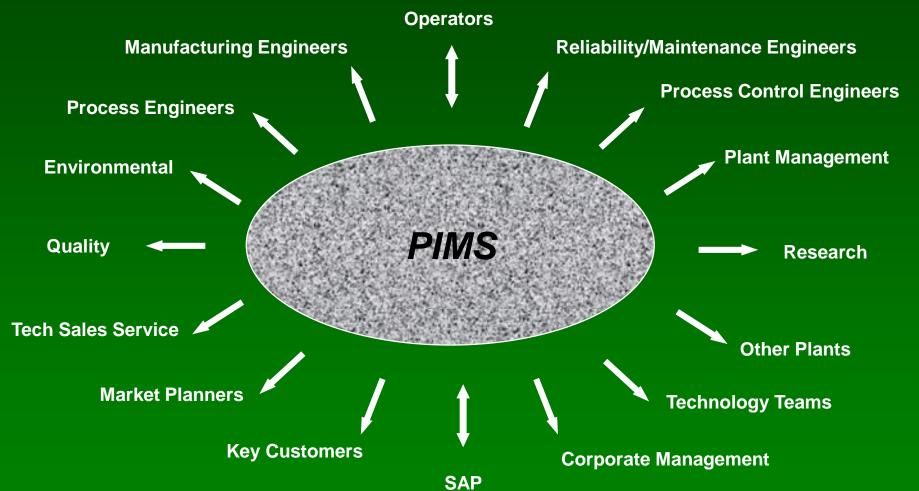
Command
(Business Decisions)

Coordination
(Plant Decisions)

Control
(Process/Line Decisions)

SAP R/3

PIMS

SAP provides ERP and (some) MES functionality, but a gap exists at the plant level

InSQL

PLC

Panelboard

Advant IMS/EH

DCS

NIST CIM Model

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The Real Information Benefit . . . .

Summary

- Better information for quicker decision-making throughout
  (much like SAP but truly focused on the plant <u>and</u> process level)

- Same information shared amongst all
  ("true" Knowledge Management for a process plant)

- Integrated process, quality, and operator information available for
  analysis and identification of improvements

- Complements (does not compete with) SAP

- Most importantly: all in real-time!!

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The Facts

Three Overall Objectives

- Collect real-time process & quality data from major plant control systems (DCS and PLC) at all MCH manufacturing locations storing it online for efficient access

- Share data and develop applications within manufacturing locations <u>and globally</u> amongst locations and groups based on common definitions

- Establish a bi-directional interface between PIMS and the SAP R/3 business system

    ….. Why? Recall that Millennium is a global collaborative enterprise driven by efficiency and Operational Excellence

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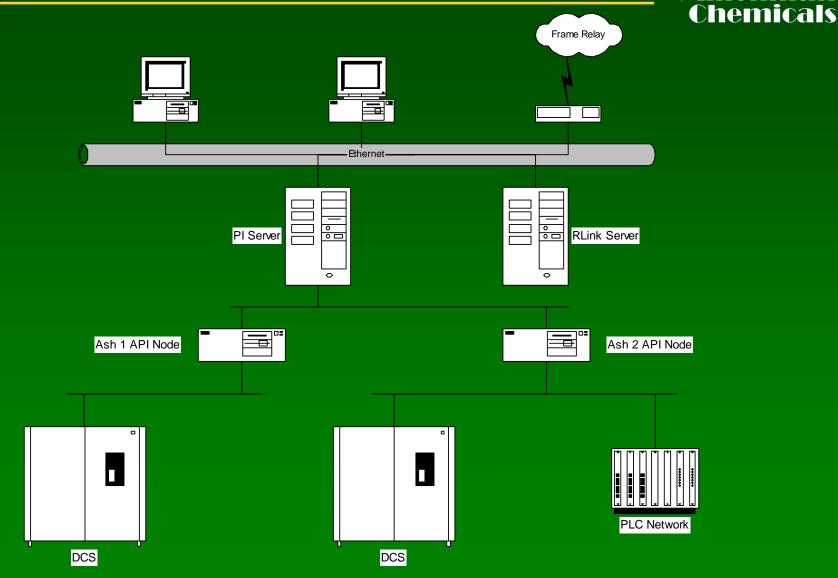
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The Industrial Desktop (Okay, Pat is Right!)

PIMS is Information Infrastructure

- <u>Not</u> a monolithic project for all applications

- Improve global solutions with basic functionality in the areas of quality, reliability, & production reporting

- Interface with "high-end" applications packages in modeling, and other specific areas

- Global PIMS is the key element in performance management

PIMS has been established as <u>the</u> primary data source for detailed process data in the same way that we establish SAP/BW as the primary data source for business cost data

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Typical Site Architecture

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Frame Relay

Ethernet

PI Server

RLink Server

Ash 1 API Node

Ash 2 API Node

DCS

DCS

PLC Network

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Highlights of PI Implementation

- OSI/PI at Nine (9) MCH Sites
  - 5,000 - 80,000 tags per site
  - 1,200+ users, in 17 months,
  - Significant savings

- Implemented globally (…. And **EASILY**!)
  - <u>without</u> a project team,
  - <u>without</u> headcount additions,
  - within days at each site

- Corporate Master License Agreement
  - Pick the leading company, get your best price, and get going!

- "All You Can Eat" is the Only Way to Enjoy Your PI !!

- Cultural Transformation

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The Positive Impact of PI

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PI is an Essential Tool

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- PI = an Essential Tool for Operational Excellence in ….

  + Quality   - Six-σ, MTT, integrated lab/process data, eliminating manual logs **+**

  Reliability   - RCA, incident investigations, condition monitoring

  + Process Control   - scorecard, control monitor performance tool, alarm management,

  remote troubleshooting

  + Production   - shift reports, daily production summary, auto tank taping, downtime

  + SHE   - compliance tracking, investigations, operating closer/at permits

  + Research   - plant troubleshooting, product development trials, model calibration

  + Supply Chain   - inventory monitoring, interplant coordination, VMI

- Ongoing savings in Many Areas

- Need More Applications for Operators, Engineers, & Management

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Pi is an Essential Tool

- Like any tool it must be used!
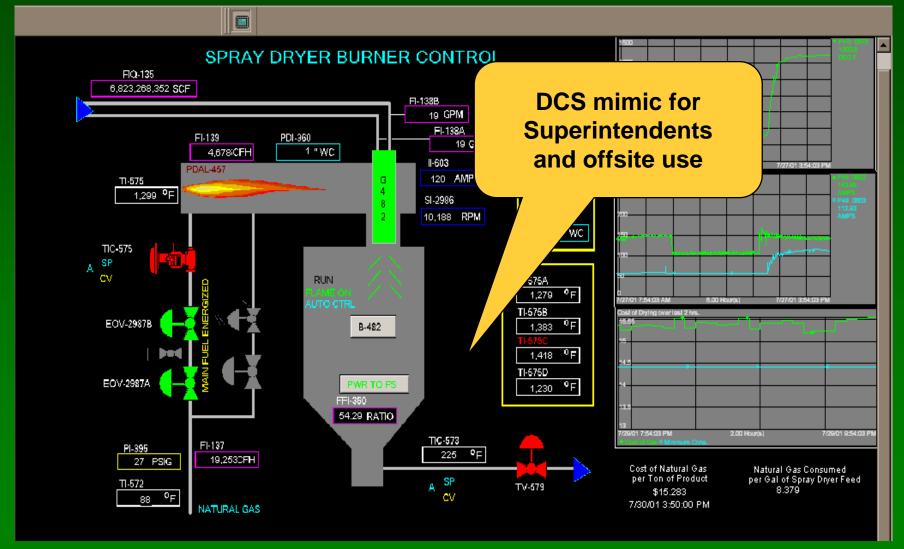
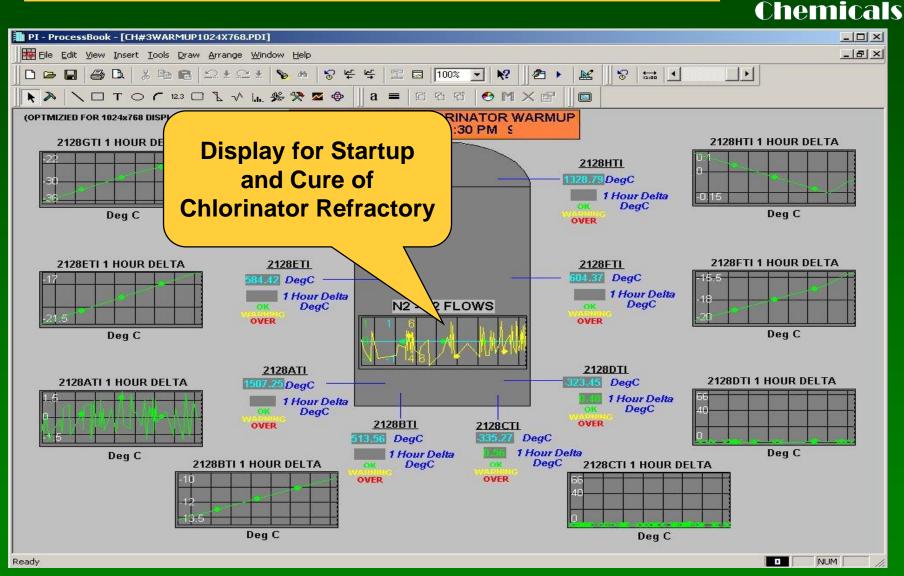 *By itself, Pi saves Millennium absolutely <u>no</u> money,*

  … BUT …

  to the extent that PI puts accurate, timely information and historical perspective into the hands (and minds) of skilled employees and decision-makers, it is an engine for EVA!!

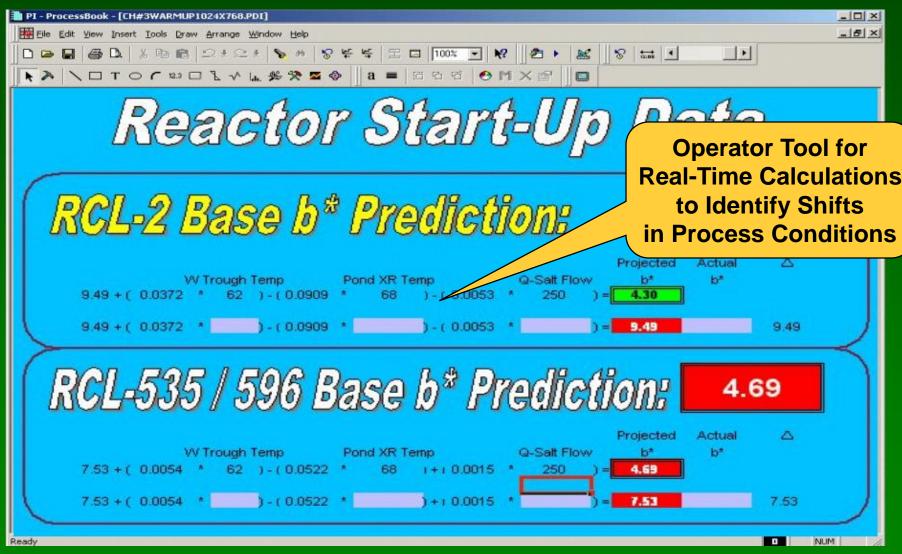# Performance Management - Turning Data Into Dollars
The Impact of PI Applications

SPRAY DRYER BURNER CONTROL

DCS mimic for Superintendents and offsite use

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The Impact of PI Applications

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Display for Startup and Cure of Chlorinator Refractory

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The Impact of PI Applications

Operator Tool for Real-Time Calculations to Identify Shifts in Process Conditions

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PI Enables Six Sigma
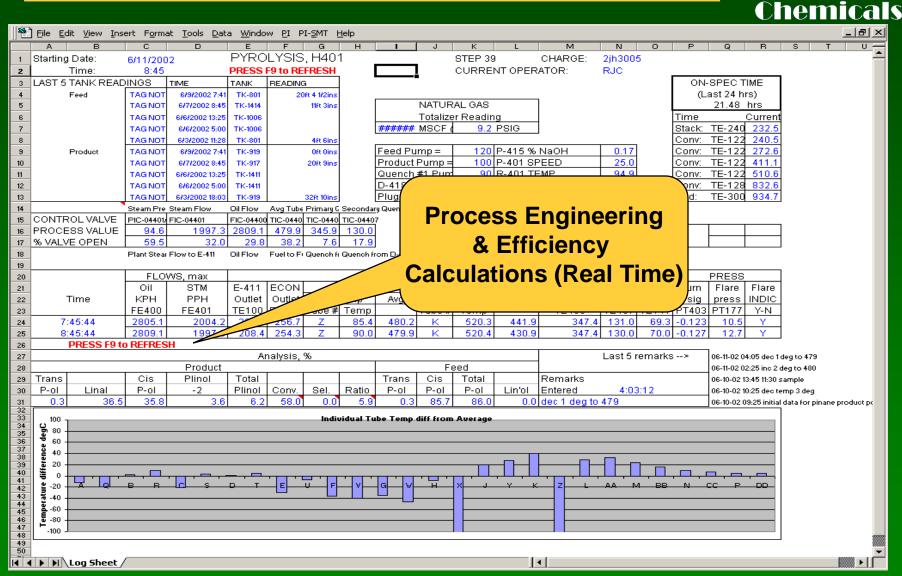
"Without PI, the Measurement phase of a Six Sigma project will quadruple! PI has given everyone the ability to view, collect, and manipulate data to their specific needs both historically, and in real-time"
MCH Black Belt (with $670k+ YTD in project savings)

"I spent 3 days reconstructing process trends via operator logs for the quench issue in August and November of 2000. With PI, the data I required is available to me in 3 minutes!"
MCH Process Engineer
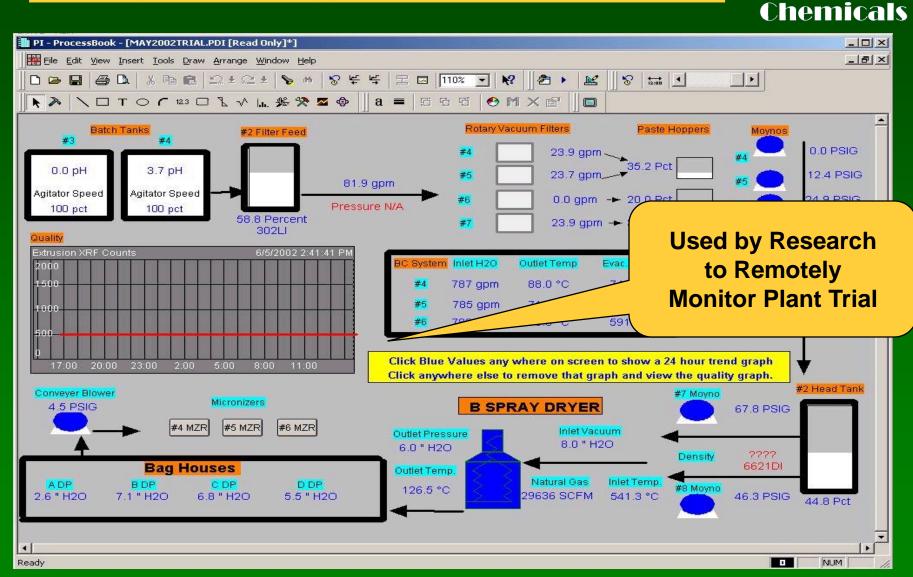
""We have to have PI if we want to improve quality. We need to understand what's going into PI and what KIVs we need to control (& how well) to improve our performance. "
MCH Quality Manager

A Tool for Identifying & Capturing Improvements.

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The Impact of PI Applications

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Process Engineering & Efficiency Calculations (Real Time)

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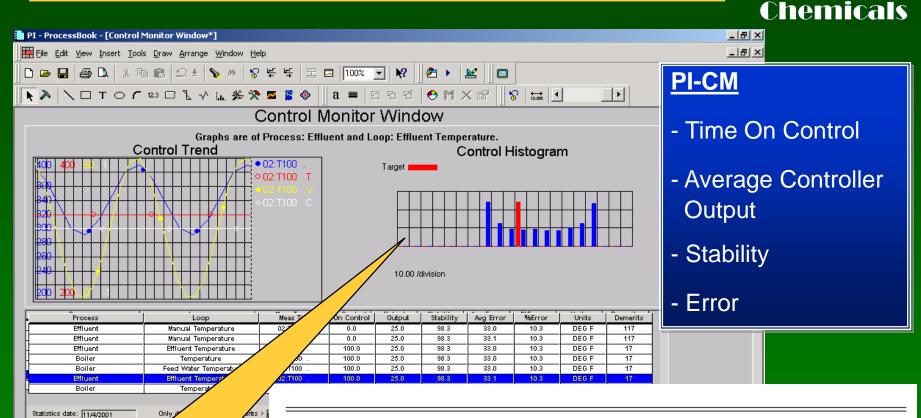# Performance Management - Turning Data Into Dollars
The Impact of PI Applications

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The Impact of PI Applications

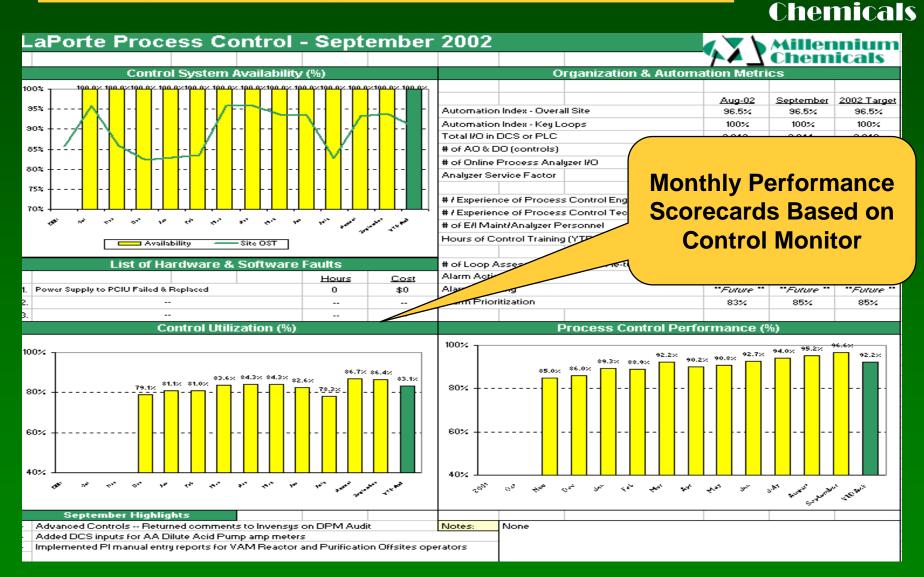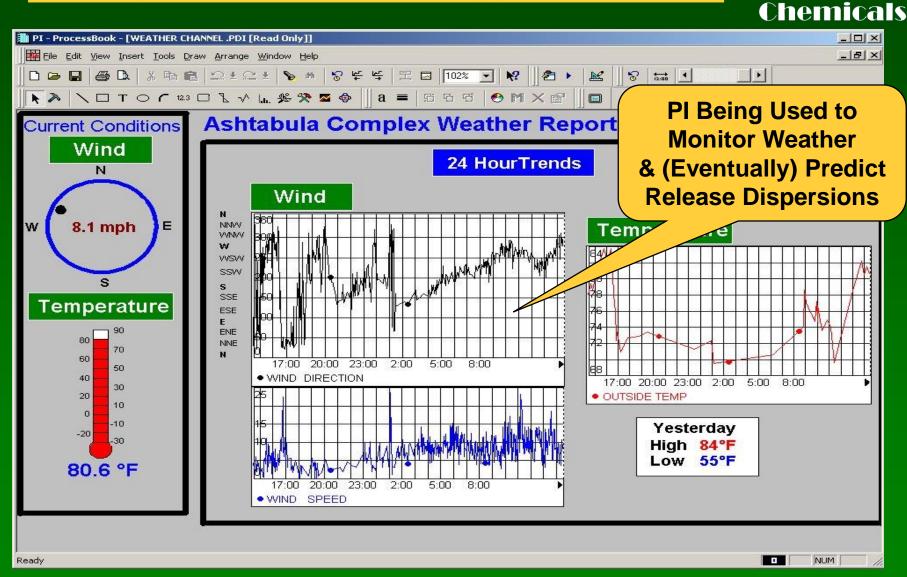*Connect to a world of solutions*

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The Impact of PI Applications

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Performance Management - Turning Data Into Dollars
The Impact of "Unusual" PI Applications

PI Being Used to Proactively Monitor Network Status
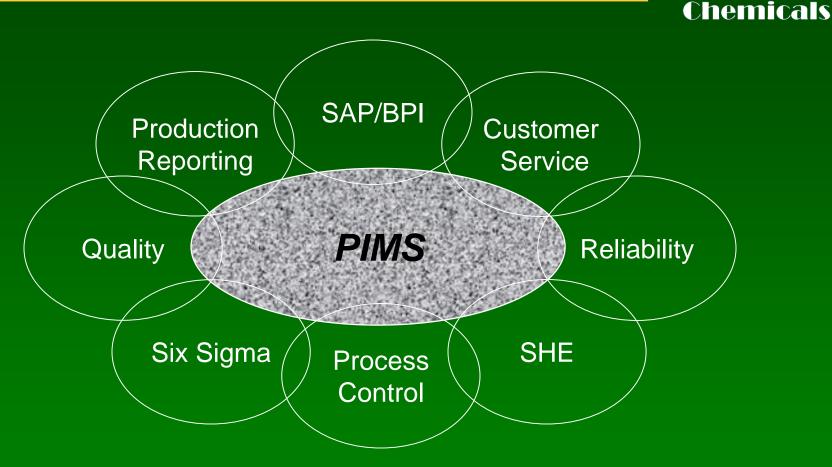
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The Impact of "Unusual" PI Applications

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Not All Things to All People …. But Close

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- Sharing applications amongst sites (including stealing, copying, & competing) has contributed to documented savings measured in M$

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Not All Things to All People …. But Close

Plus Many Beneficial Effects of a "PI Culture"

- Process troubleshooting

- Manufacture to target

- Downtime reporting

- Quality management (lab info, in-process, comments, SPC)

- Maintenance reliability analysis (including risk-based inspection)

- Customer Service and complaint investigation analysis

- Data for first principle and neural network modeling

- Research support for manufacturing

- Process control – data reconciliation and validation

- Process control – process control performance metrics

- More historical data than a DCS without jeopardizing control load

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PIMS Plans Moving Forward

Millennium Has Accomplished Much

- Not just a process control resource!!
  - At-site and off-site
  - Pi is for process …..
    technical …..
    site manufacturing …..
    Millennium …..
    …. in fact, <u>all</u> enterprise personnel

- Pi-ProcessBook is easy enough for everyone to use
  - Applications built by operators & production personnel
  - Quick common applications are the key!

- PI makes six sigma work. It shifts the focus from gathering data to analyzing and ACTING!

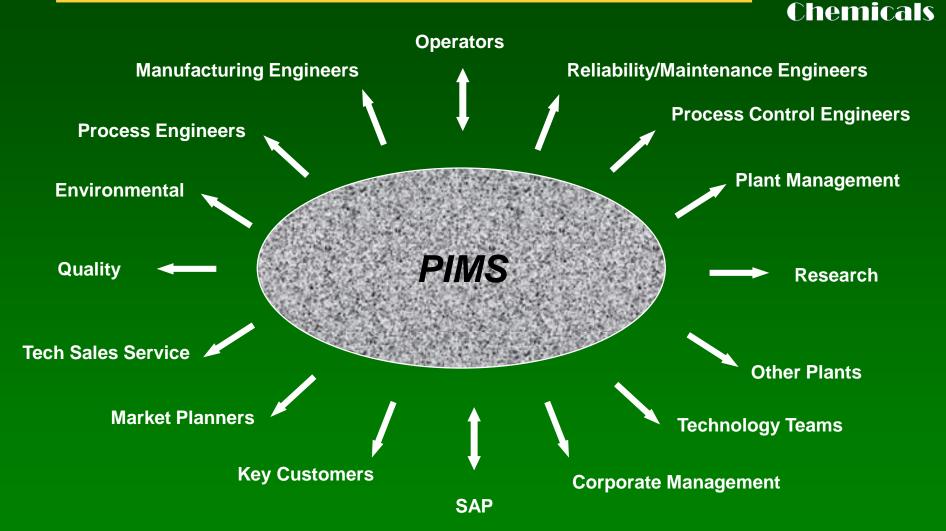- The biggest risk is cultural change - but so far so good.

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The Feast Continues ….

- Pi-SQC
  - A great tool & fully integrated

- R-Link
  - Predictive Maintenance
  - Integrated Production Accounting

- Module Database
  - One of Pi's best kept secrets

- ICE …. Very "Cool"!

- More Applications, More Modeling, & Real Time Decision-Making

- All You Can Eat" is the Only Way to Enjoy Your PI !!

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