



Implementation and Management of a Global Distributed PI Infrastructure

Jim Cummins
Manager: Systems Integration
Specialty Minerals



Mike Purcell
Director of Process Industries
Omicron (USA)



Minerals Technologies Inc.

®

Minerals Technologies
(Sales US \$1billion)



Is a Global Resource- and Technology-Based Growth Company that Develops, Produces and Markets The Highest Quality Performance-Enhancing Minerals and Related Products, Systems and Services

Minerals Technologies Inc.

2006 Sales

Minerals Technologies
(US \$1billion)



**Refractory products
and technology for
steelmaking
(~ 33%)**

Minerals Technologies Inc.

2006 Sales

Minerals Technologies

(US \$1billion)



**Precipitated Calcium
Carbonate products**

(~ 52%)

Paper Industry

**Refractory products
and technology for
steelmaking**
(~ 33%)

Minerals Technologies Inc.

2006 Sales

Minerals Technologies

(US \$1billion)



Precipitated Calcium Carbonate products + Processed Minerals

(~ 52%)

(~ 15%)

Refractory products and technology for steelmaking
(~ 33%)

Paper Industry

Construction, Plastic, Food & Glass Industries

Minerals Technologies Inc.

2006 Sales

Minerals Technologies

(US \$1billion)

PI Implementation



Precipitated Calcium Carbonate products + **Processed Minerals**

(~ 52%)

(~ 15%)

Refractory products and technology for steelmaking
(~ 33%)

Paper Industry

Construction, Plastic, Food & Glass Industries

SMI Overview

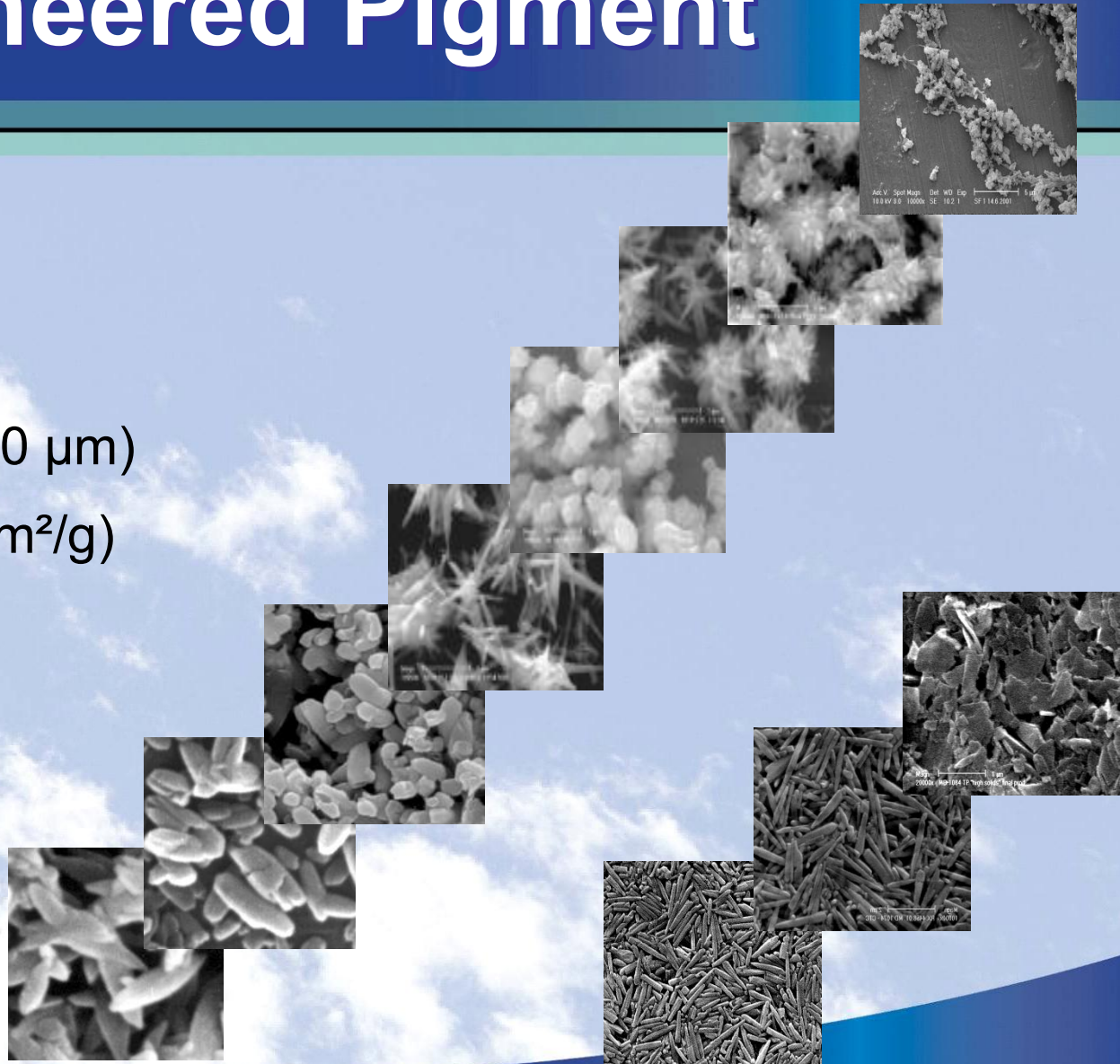
- SMI is the leading supplier of PCC (Precipitated Calcium Carbonate) worldwide.
- Our ability to customize filler and coating PCC products has made us the pigment supplier of choice for paper mills throughout the world.

PCC Engineered Pigment

5 Degrees of Freedom

- Particle structure (morphology)
- Particle size (0.3 – 4.0 μm)
- Surface area (2 - 80 m^2/g)
- Distribution
- Surface chemistry

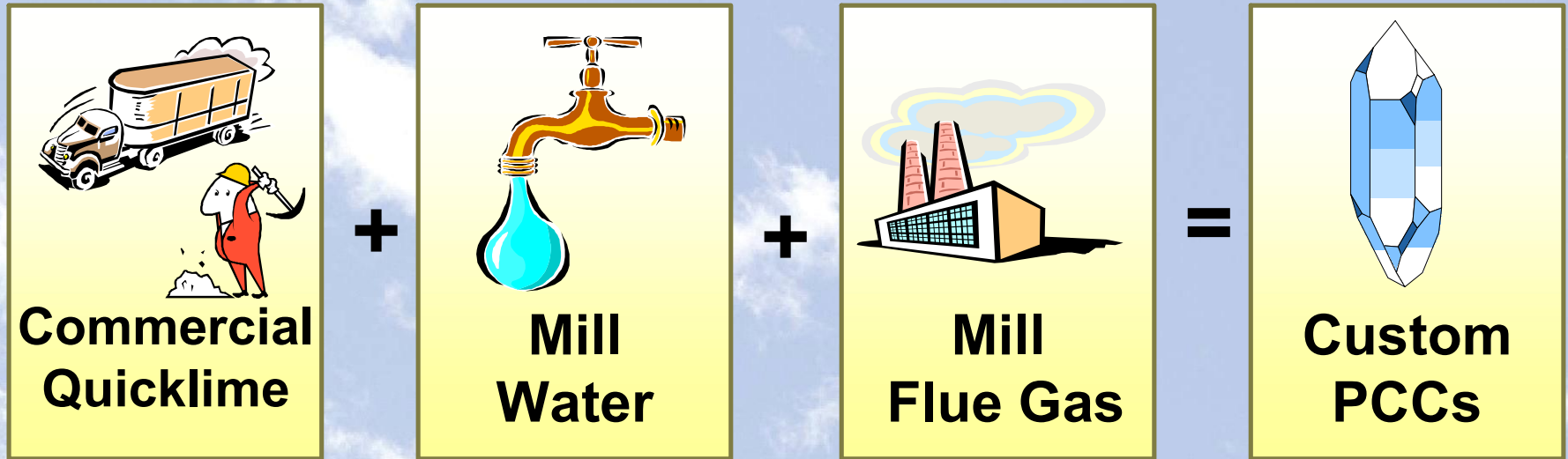
*strength, bulk,
light scattering,
sizing, retention,
porosity, gloss, ink
absorption, etc. ...*



PCC Facility: Ashdown Arkansas

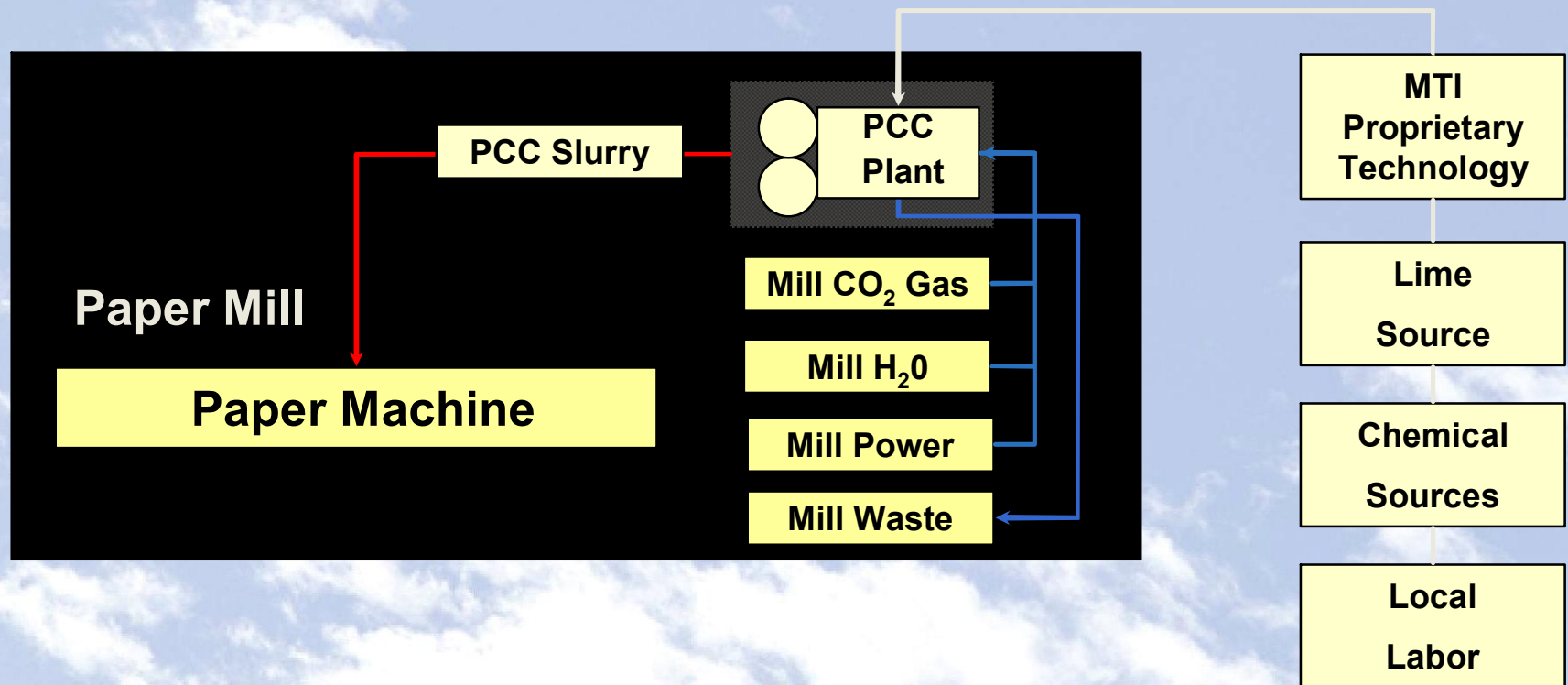


PCC manufacturing process



Satellite Concept

Symbiotic Relationship with Customer



MTI – a global manufacturing presence



North America	43
Europe	17
Asia	8
Latin America	5
Africa	1
Total	74

MTI Vision

- Organizing and managing the information workspace
- Standardize work practice
- Increase speed and accuracy of work execution
- Operational Excellence
 - ▶ Improve Return on Capital
 - ▶ Improve Profitability

Implementation Challenge

- Cost effective collection of Process Data for many small facilities (< 3000 tags)
- Minimal requirements for plant level support
- One central data repository for all information
- Consolidation of plant information into management reporting and dashboards
- Integration of non-PI data
- Web based information and reports

Implementation plan

● Phase I

- ▶ Install OSI PI and MS SharePoint 2003 web server
- ▶ Interface 25 PCC manufacturing facilities using OPC Interface to Siemens PCS 7 control systems
- ▶ Expand to Include 7 Process Minerals facilities using various PC based control systems
- ▶ Using web parts, excel, and Process book create basic plant graphical overview, dashboards, and production reports
- ▶ Timing: POC 2005

Implementation April 2006 – Dec 2006: User count 50 ¹⁵

Implementation plan

● Phase II

- ▶ Increase Interface count to 50 PCC manufacturing facilities using OPC Interface to Siemens PCS 7 control systems
- ▶ Using web parts, excel, and Process book create basic plant graphical overview, dashboards, and production reports using SharePoint Services and RtPortal.
- ▶ Timing: Through 2007: User count 150

Implementation plan

- Phase III

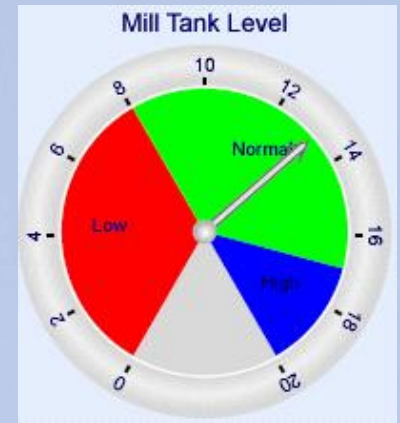
- ▶ Migrate to MS SharePoint 2007 web server
- ▶ Add additional interfaces to include Minteq
- ▶ Improve user interface to reports and expand scope to include document control features of SP 2007 and associated team sites
- ▶ Integrate financial and maintenance information with production data collected from PI
- ▶ Timing: July 2007 – Dec 2008: User count 300

Operational Tools

- KPI Dash Boards

Status at a glance

- ▶ Production
- ▶ Quality
- ▶ Maintenance
- ▶ Product and operating costs
- ▶ Determine how the business is performing against plan.



Operational Tools

- Operations Alerts

Report by exception

- ▶ Production
- ▶ Quality
- ▶ Maintenance
- ▶ Product and operating costs



Operational Tools

- Conditional based maintenance

PI production data feeds maintenance system

- ▶ Drives work requests
- ▶ Reduces operational costs



Operational Tools

- Quality reporting

Implementation of SPC

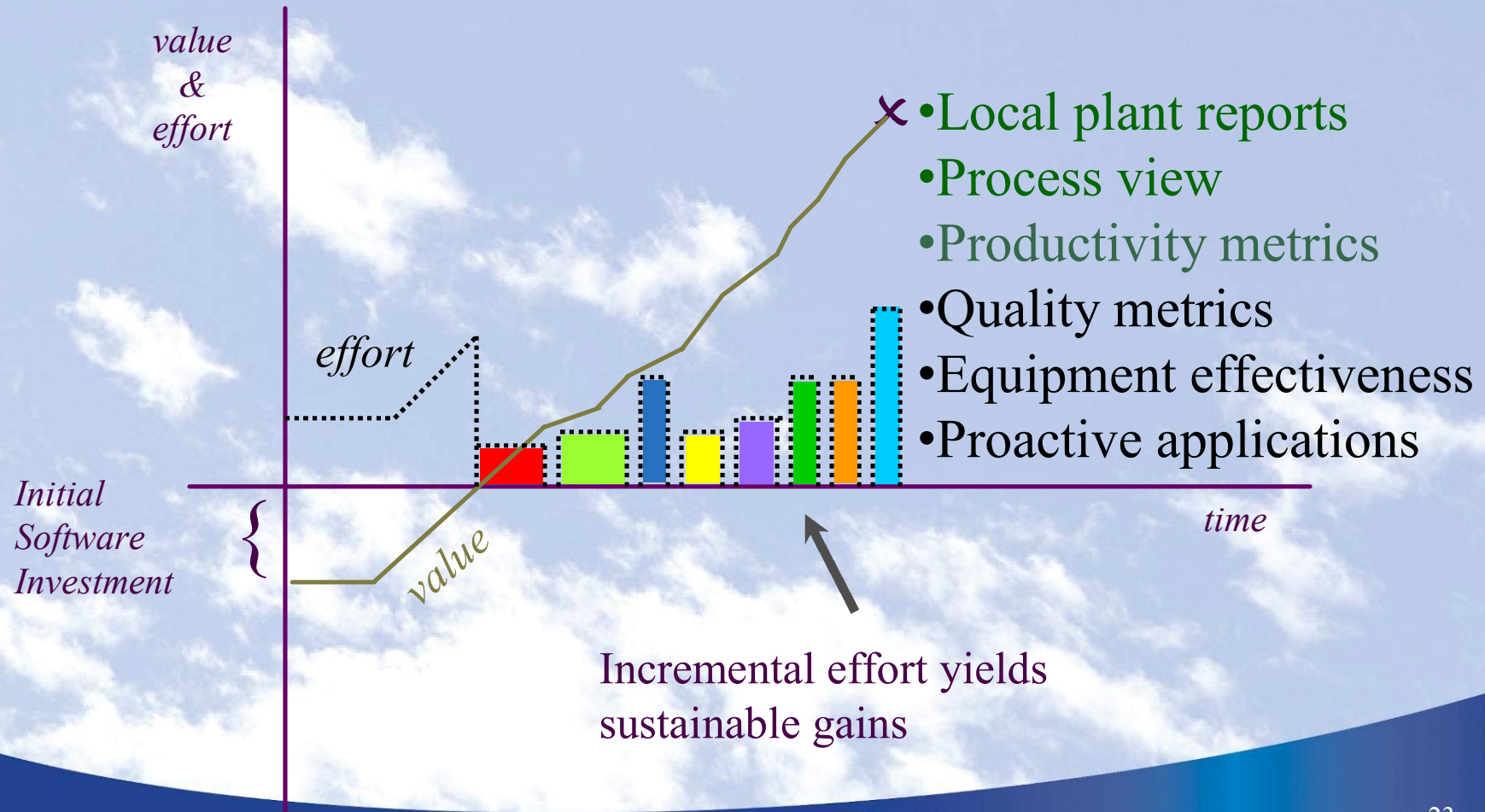
- ▶ Establish tight control
- ▶ Quality metrics
- ▶ Reduce product variability



Systems and Products used

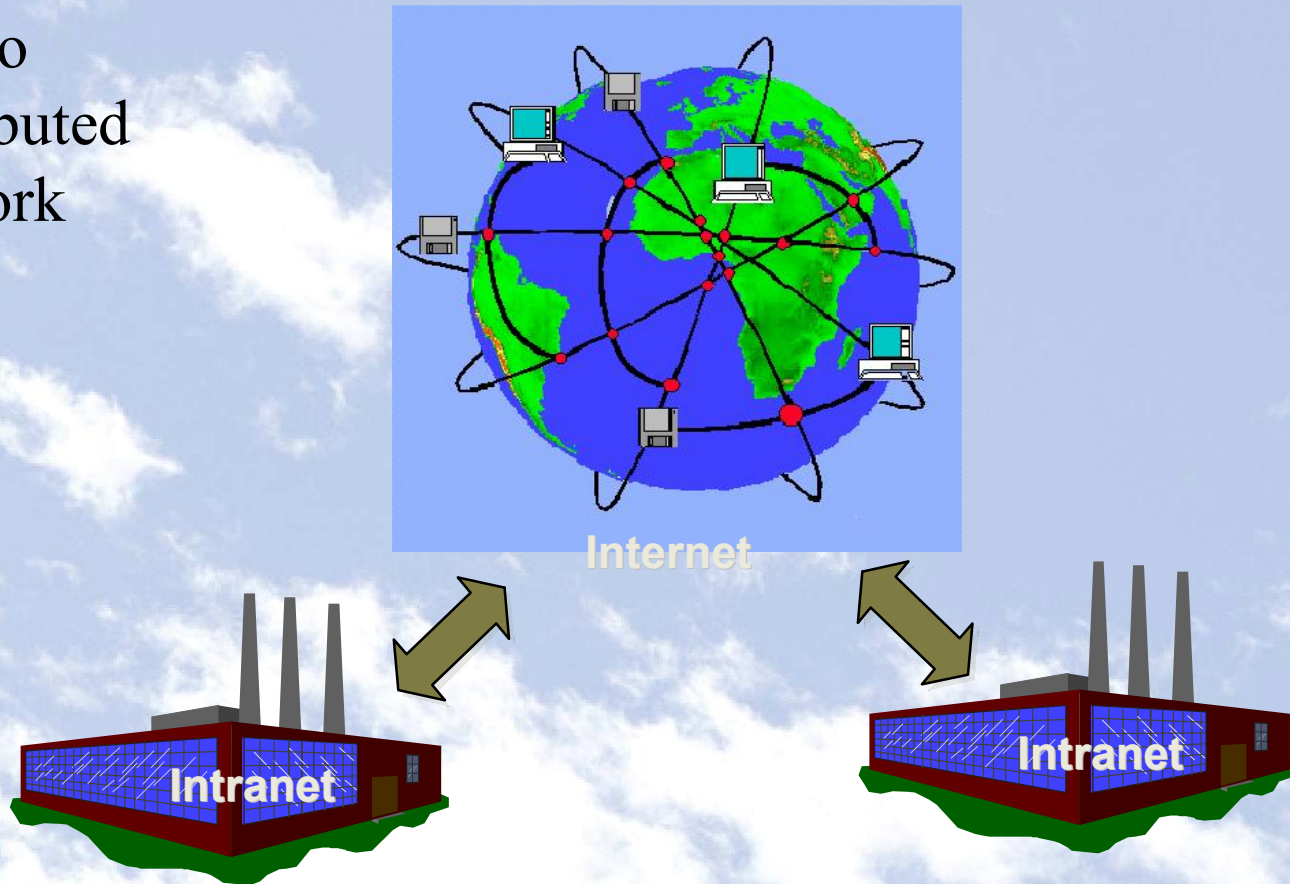
- 150K PI Enterprise server
 - ▶ 50 OPC interface to Siemens PCS 7 control system
 - Batchview
 - SQC Add-in
- RtPortal
- PI-to-PI
- MS SharePoint
- Oracle ERP

Value Now, Value Over Time



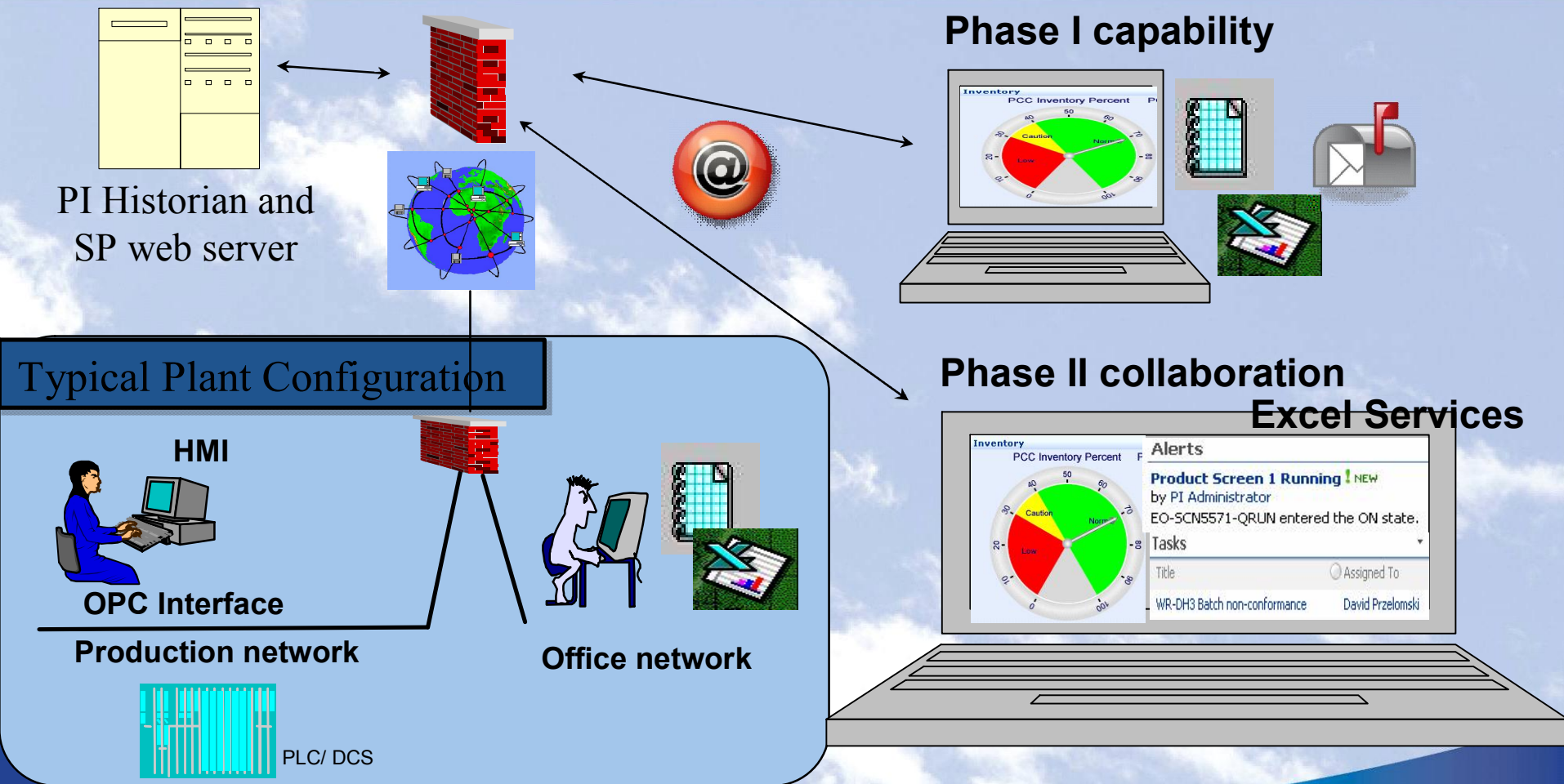
Secure Internet connections

Key to
distributed
network



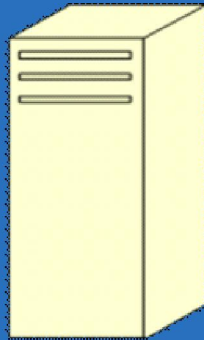
Capability

Remote access to Operational Tools, Dashboards, Alerts, and Tasks



“Extensible Server design”

Initial Setup



Front-End Web Server

- Web Server
- Forms Server
- Excel Server
- Search Server
- Index Server

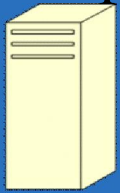


SQL Server

- Content Database
- Configuration Database
- Search/Index Database

“Extensible Server design”

Initial Setup



Front-End Web Server

- Web Server
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- Excel Server
- Search Server
- Index Server



SQL Server

- Content Database
- Configuration Database
- Search/Index Database

100 users

Expansion & Growth

Controlling cost

Expansion capability over time
without losing past investment

Growth



Front-End Web Servers

- Web Server
- Excel Server
- Search Server



- Web Server
- Forms Server
- Search Server
- Index Server



SQL Server

- Content Database
- Configuration Database
- Search/Index Database

300 users

“Extensible Server design”

Initial Setup

100 users



Front-End Web Server

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SQL Server

- Content Database
- Configuration Database
- Search/Index Database



Growth

300 users



Front-End Web Servers

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- Excel Server
- Search Server
- Web Server
- Forms Server
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- Index Server

SQL Server

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- Configuration Database
- Search/Index Database

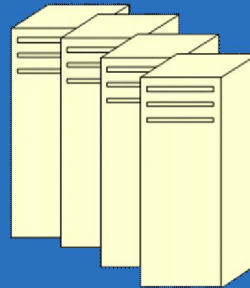
Expansion & Growth



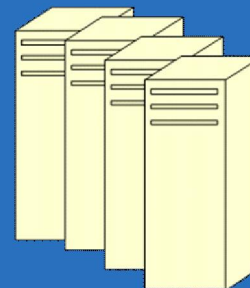
Controlling cost

Expansion capability over time
without losing past investment

1,000 users

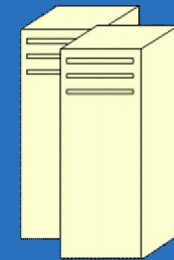


Front-End Web Servers



Application Servers

- Forms Server
- Excel Server
- Search Server
- Index Server



SQL Servers

- Content Databases
- Configuration Database
- Search/Index Database

Phase I Implementation

- Real-Time Data Updates in a Browser
- Daily and weekly production reports
- Web based process graphics
- Process modeling and system analysis

Home site

Document Link
General
Announcements
Team site Link
Status Display

The screenshot shows the 'Team Web Site' Home page. The left sidebar contains a 'Documents and Lists' menu with links to Shared Documents, System Down Time, Pictures, Lists, Contacts, Tasks, Discussions, General Discussion, and Surveys. The main content area has sections for Announcements, Events, and PI Connection Status. The Announcements section shows a post titled 'Multiple Login Solution' by David Przelomski dated 3/26/2007 12:12 PM, with the text 'Franklin and Cleburne Sites have been added to the active site list effective Jan 15, 2007'. The Events section states there are no upcoming events. The PI Connection Status section displays a table of site connection statuses. The right sidebar features the Minerals Technologies logo and a 'Links' section listing various team sites.

Home Documents and Lists Create Site Settings Help

Team Web Site
Home

Modify Shared Page

Documents
Shared Documents
System Down Time
Pictures
Lists
Contacts
Tasks
Discussions
General Discussion
Surveys

Announcements
Multiple Login Solution
by David Przelomski 3/26/2007 12:12 PM
Franklin and Cleburne Sites have been added to the active site list effective Jan 15, 2007
Add new announcement

Events
There are currently no upcoming events. To add a new event, click "Add new event" below.
Add new event

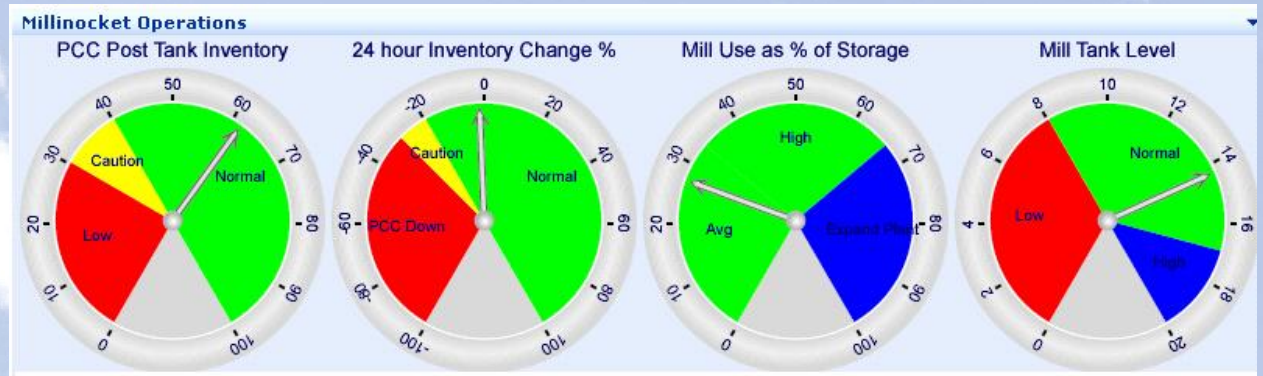
PI Connection Status
Interface Connection Status
●● Is Computer or Network Problems

North America PCC	Europe/Africa PCC	Processed Minerals
Ashdown ●●	Aanekoski ●●	Brookhaven ●●
Camas ●●	Alzay ●●	Canaan ●●
Chillicothe ●●	Figueira da Foz ●●	Lucerne Valley ●●
Eastover ●●	Hermalle ●●	
Franklin ●●	Kuldryn ●●	
International Falls ●●	Nerebank ●●	
Jackson ●●	Ruzomberok ●●	
Jay ●●	Schongau ●●	
Langley ●●	Walsum ●●	
Millersiet ●●		
Pilot Plant ●●		
Plymouth ●●	High Solids Skid ●●	
Port Hudson ●●		
Quinnesec ●●		
Selma ●●	Asia PCC	
Ticodroma ●●	Suzhou ●●	
Wisconsin Rapids ●●	Zhenjiang ●●	
South America PCC		
Laiz Antonio ●●		

Links
Aanekoski Team Site
Alzay Team Site
Ashdown Team Site
Brookhaven Team Site
Camas Team Site
Canaan PM Team Site
Canaan Wire Team Site
Chester Team Site
Chillicothe Team Site
Cleburne Team Site
Dover Team Site
Dryden Team Site
Easton Pilot Plant Team Site
Eastover Team Site
Figueira Da Foz Team Site
Franklin Team Site
Gauiba Team Site
Hermalle Team Site
High Fiber Skid Site
International Falls Team Site
(More Links...)
Add new link

Team site Overview

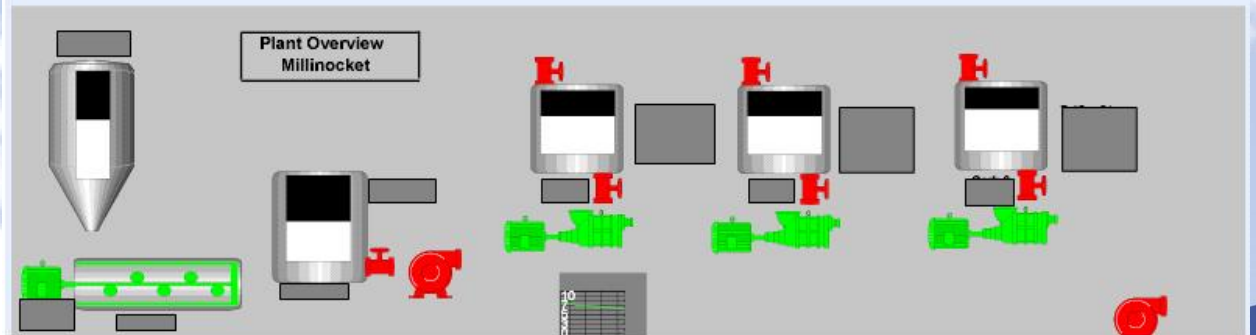
KPI Display →



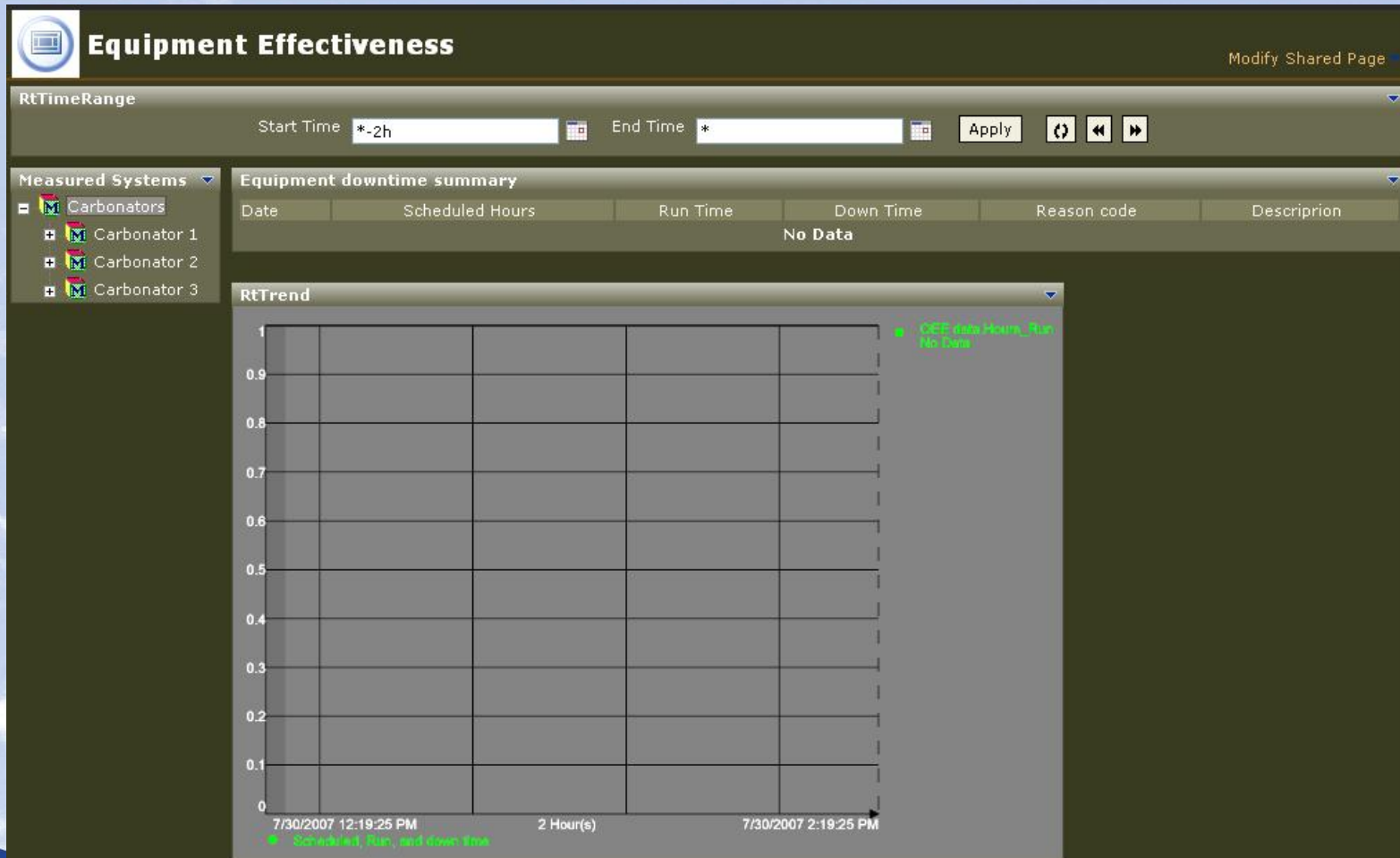
Trends →

Millinocket Overview

Status Display



RtWeb Parts example



Batch Reports example

Plant Y

Batch Report Summary

7/3/2006

Environmental reporting

Step 1: Enter date in fields below

Day	Month	Year
3	7	2006

Step 2: Click the button to get the daily summary

GetSummaryData

Step 3: Verify the accuracy of the data in the table below and to the left

Step 4: Click the button below to update the yearly summary tab

UpdateYearlySummary

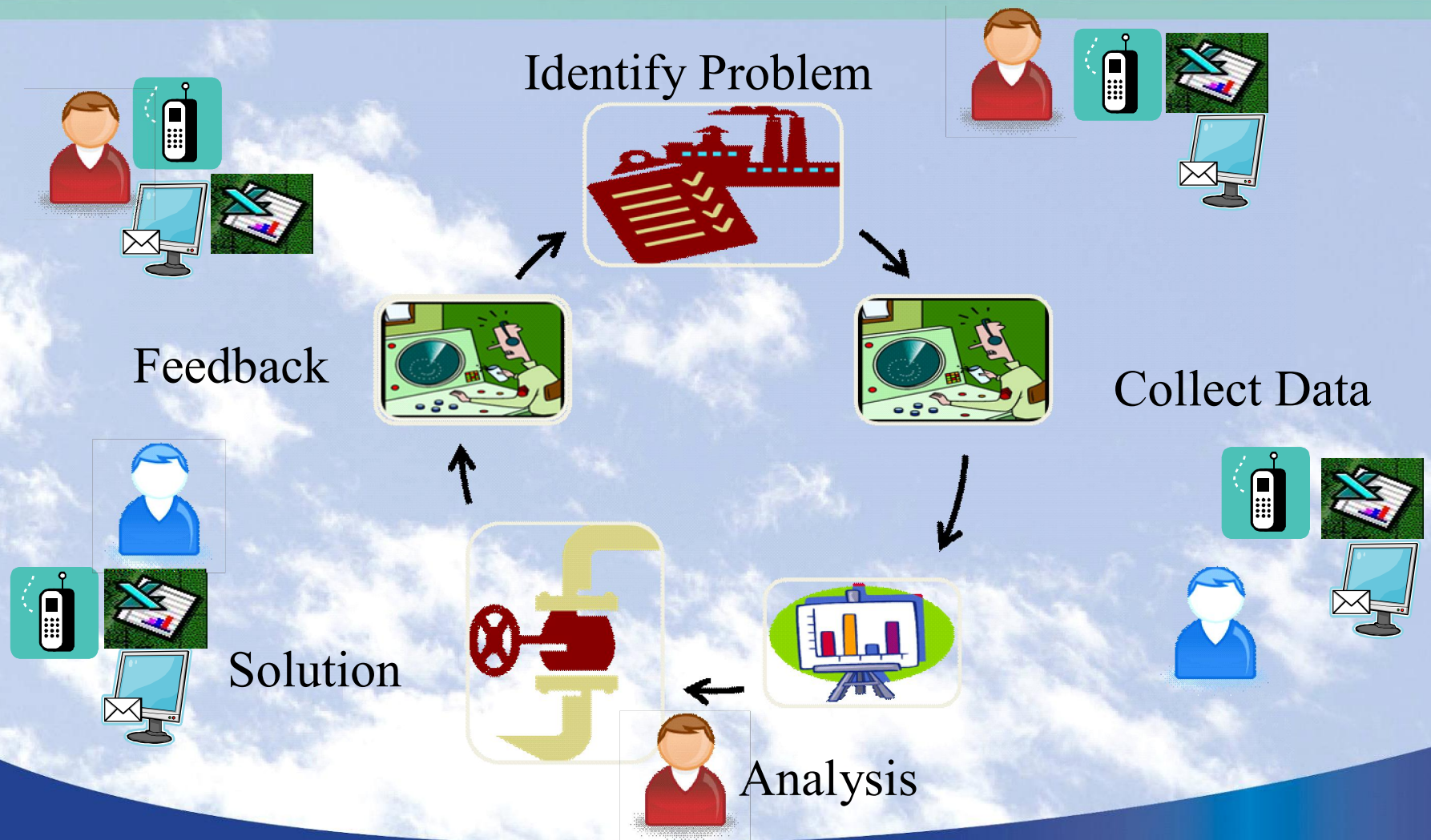
	Total # Batches	Batch Cycle	Gassing Time
Carb 1	10	100	100
Carb 2	10	100	100
Carb 3	10	100	100
Carb 4	0	0	0
Carb 5	0	0	0
Carb 6	0	0	0
Carb 7	0	0	0
Total	30	300	300

Batch	Start Time	End Time	Duration	Product	Carb	Batch Cycle	Gassing Time
605331	7/2/2006	7/3/2006	72:00:00	2	1	xx	xx
605332	7/2/2006	7/3/2006	73:00:00	2	1	xx	xx
605333	7/2/2006	7/3/2006	74:00:00	2	1	xx	xx
605334	7/2/2006	7/3/2006	75:00:00	2	1	xx	xx

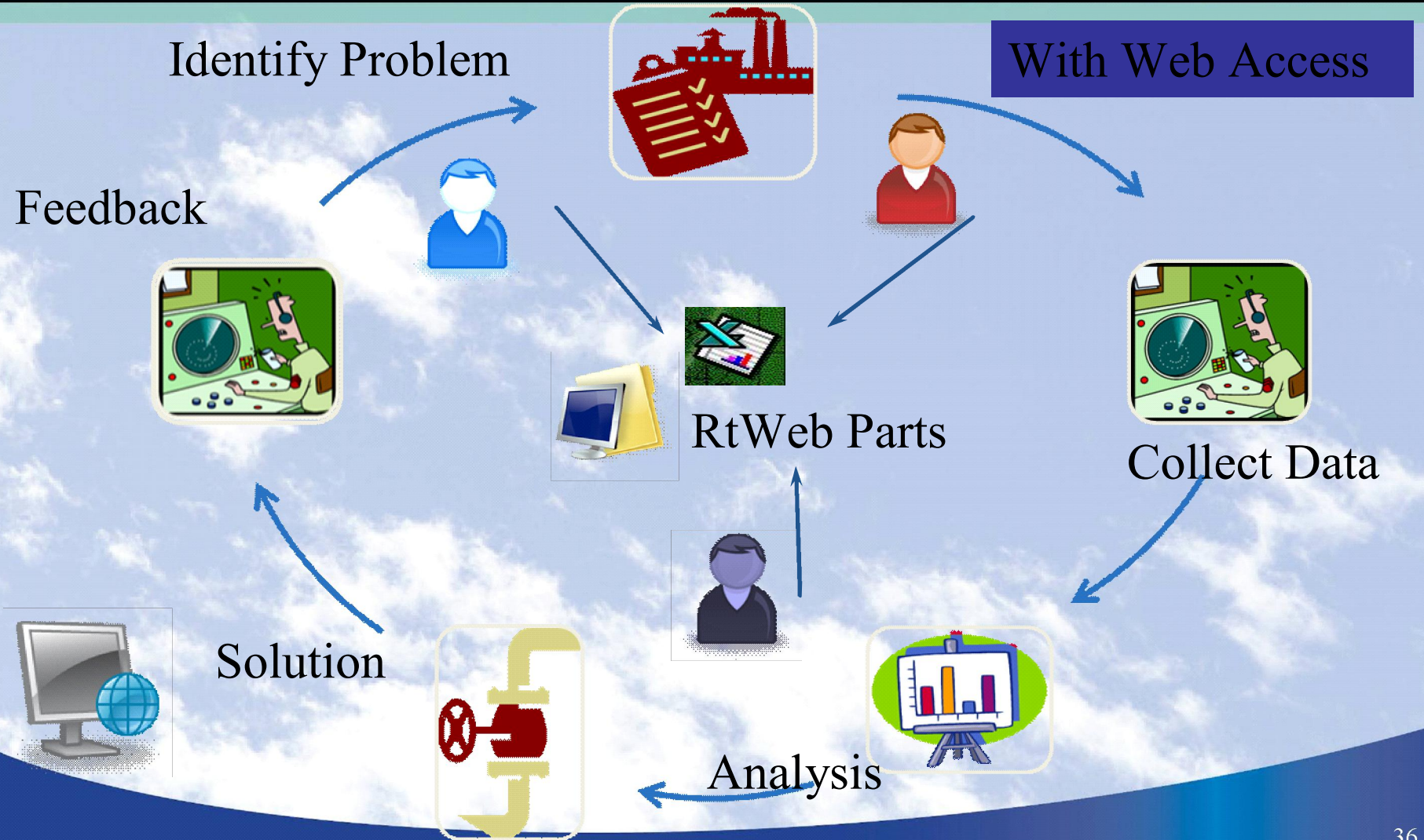
Phase I: System Users

- Customers / Suppliers
- Upper Management
- Business Teams and Work Groups
- Operations and Operations Management
- Technical and Operations Support Groups

Previous Information Flow



Collaborative Process Improvements



Benefits of collaboration

Web Data Access

Effects:

- Opportunity identification
- Data Collection
- Analysis
- Verification

Results in:

- Reduced time cycle
- Less effort
- Defined metrics
- Improved ROC



Phasing

Phase	Components	Status	Timeframe
I	PI Infrastructure for PCC Sites	Complete	2006
II	Expand Capacity and Interface Additional Sites	In-Progress	2007/2008
III	Advanced Applications using RtWebParts and MOSS 2007	Planning	Mid 2007 -

Phase III Goals

- Integrated and contextual views of process operations and financial impact
- Document control and collaboration
- Standardize Process
- Eliminate Antiquated Processes/Systems
- Alerting and Advanced Applications

The Approach

- RtPortal Workshop
 - ▶ Vision
 - ▶ Architectural Design & Proof of Concept
 - ▶ Implementation Planning

Process

- Training
- Visioning/Requirements/Scoping
- Architecture
- Proof of Concept
- Implementation Plan

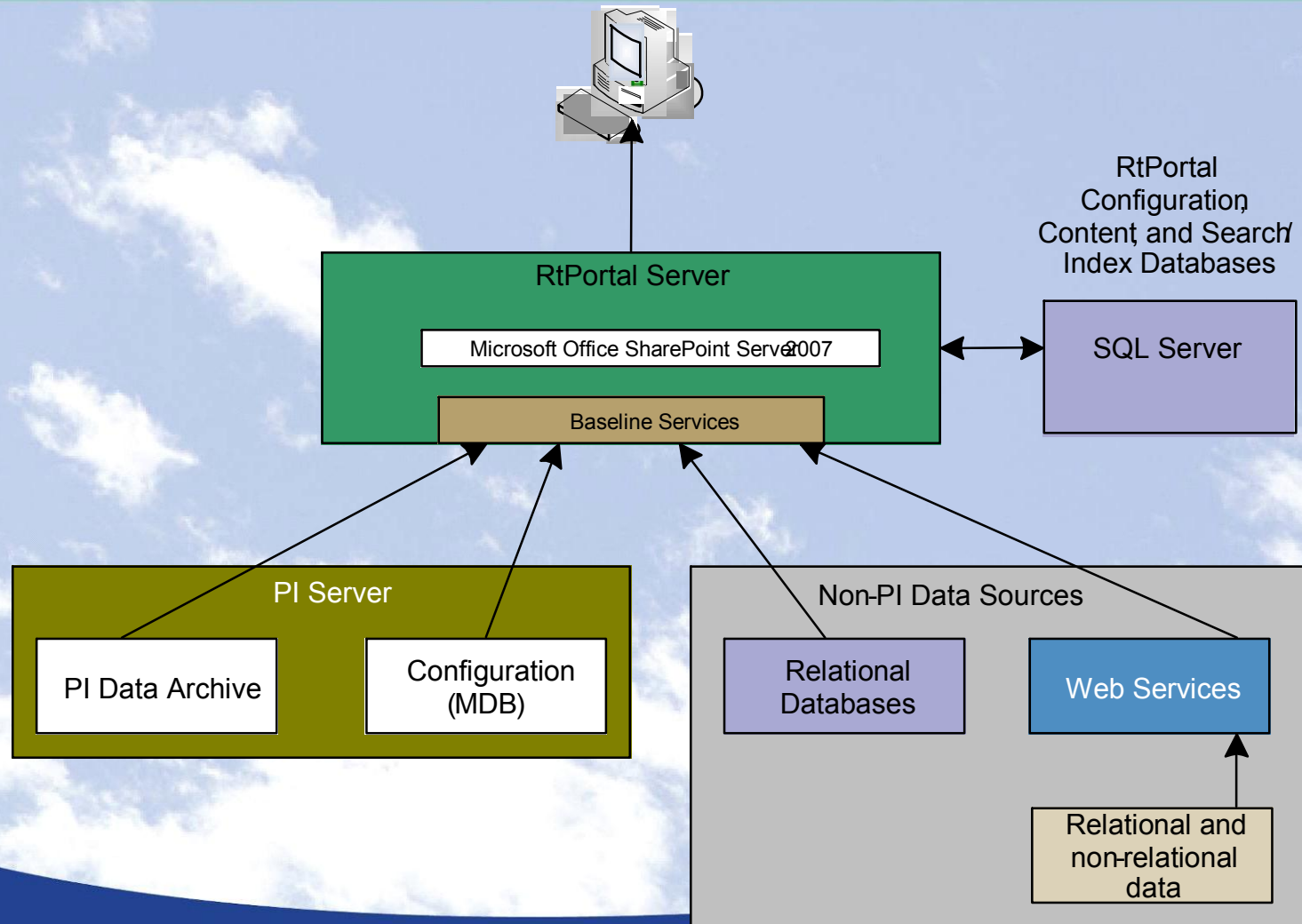
Timeframe

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 7	Week 8
Kickoff							
Training Preparation							
Training Setup							
Training							
Overall Strategy Sessions							
POC Requirements Session							
POC Preparation							
POC Workshop							
High Level Architecture Document							
Implementation Plan							
Final Presentation							

Vision

- Enhance Management Control
- Improve Global Communication
- Increase Efficiency of the Business Process
- Cost/Incident Avoidance
- Leverage Current Technology Direction (OSIsoft)

Architecture



Advanced Functionality

- Document Management/Workflow
- Process Modeling/Optimization
- Lab Data Collection/Analysis/Reporting
- Statistical Process Control
- Batch/Recipe Workflow
- KPI's Dashboards
- System Health Monitoring
- Environmental Reporting

RtWebparts/MOSS POC

Minerals Technologies

Welcome Jim Cummins | My Site | My Links |

All Sites Advanced Search

Minerals Technologies | Specialty Minerals | Minteq | Processed Minerals | Synsil | Environmental Health & Safety | Maintenance Practices | Policies & Procedures | **Site Actions**

View All Site Content

Documents

- Shared Documents
- Excel Spreadsheets

Lists

- Calendar
- Tasks
- Locations
- Doc Types

Discussions

- Team Discussion

Search

Test

Recycle Bin

Announcements

There are currently no active announcements. To add a new announcement, click "Add new announcement" below.

Add new announcement

Calendar

There are currently no upcoming events. To add a new event, click "Add new event" below.

Add new event

MTX Stock Quote

YAHOO! FINANCE

Enter Symbol **SEARCH**

Quote Web

NAME	LAST TRADE	CHANGE
MTX - NYQ MINERAL TECH INC	\$64.69	0.77 1.20%

1 YEAR CHART

More from Yahoo! Finance

Lower your month mortgage
Tips, tools & more at our Mortgage Center

ADD QUOTES TO YOUR SITE

QUOTES DELAYED: NASDAQ 15 MIN.
NYSE & AMEX 20 MIN.

COPY RIGHT PRIVACY


Links

There are currently no favorite links to display. To add a new link, click "Add new link" below.

Add new link

Specialty Minerals Site: KPI

Minerals Technologies

 Specialty Minerals

All Sites

Minerals Technologies | **Specialty Minerals** | Minteq | Processed Minerals | Synsil | Environmental Health & Safety | Maintenance Practices | Policies & Procedures

View All Site Content

Documents

- Document Forms
- Document Forms (by type)
- Document Forms (by location)
- Forms Instructions
- Forms Instructions (by type)
- Forms Instructions (by location)

Chillicothe

- Operator Logs

Eastover


- Operator Logs

Franklin

- Operator Logs










Wisconsin Rapids

- Operator Logs

 **Recycle Bin**


Minerals Technologies > Specialty Minerals

Site Status


Location	Interface Status	Inventory Status	Inventory Rate
Chillicothe			
Eastover			
Wisconsin Rapids			


Document List

Minerals Technologies




Minerals Technologies

Welcome Jim Cummins ▾ | My Site | My Links ▾ | 

All Sites ▾  Advanced Search

Minerals Technologies ▾ Specialty Minerals ▾ Minteq Processed Minerals Synsil Environmental Health & Safety Maintenance Practices Policies & Procedures

Site Actions ▾



Minerals Technologies > Shared Documents

Shared Documents

View All Site Content

Documents

- Shared Documents
- Excel Spreadsheets

Lists


- Calendar
- Tasks
- Locations
- Doc Types

Discussions

- Team Discussion

Search



Test

 Recycle Bin


Share a document with the team by adding it to this document library.



New ▾ Upload ▾ Actions ▾ Settings ▾

View: All Documents ▾


Type	Name	Modified	Modified By
	Energy Market Update - 20070216	3/15/2007 1:54 PM	Bryan Miller
	Railroad Fuel Surcharges - 200703	3/15/2007 1:58 PM	Bryan Miller

Document Control

Minerals Technologies Welcome Jim Cummins ▾ | My Site | My Links ▾ | 



 **Eastover** All Sites ▾  Advanced Search

Minerals Technologies | Specialty Minerals ▾ | Minteq | Processed Minerals | Synsil | Environmental Health & Safety | Maintenance Practices | Policies & Procedures Site Actions ▾

 Minerals Technologies > Specialty Minerals > Eastover > Documents

Documents

New ▾ Upload ▾ Actions ▾ Settings ▾ View: **All Documents** ▾

Type	Name	Modified	Modified By	Approval Status	Document Number
	Approved supplier list	3/21/2007 2:37 PM	Jim Cummins	Pending	EO-SUP-01
	This is a new Eastover doc	4/6/2007 9:59 AM	Jim Cummins	Draft	EO-W -08

View All Site Content


Documents

- Spreadsheets
- Documents
- SARA Reports
- Quality Data Entry

Drill-Down

- Overview
- Alerts
- uFactors
- Advanced Control

Operator Logs

 **Recycle Bin**

Lab Data Using InfoPath Entry

Batch Query

Batch Query Parameters		Batch Selection	
Batch ID	<input type="text" value="*"/>		<input type="button" value="v"/>
Start Time	<input type="text" value="*-1d"/>		<input type="button" value="v"/>
End Time	<input type="text" value="*"/>		<input type="button" value="v"/>
Unit	<input type="text" value="wr*"/>		<input type="button" value="v"/>
Product	<input type="text" value="*"/>		<input type="button" value="v"/>

Quality Data

SPEC 1	<input type="text"/>	LAB SPEC 7	<input type="button" value="v"/>
SPEC 2	<input type="text"/>	LAB SPEC 8	<input type="text"/>
SPEC 3	<input type="text"/>	LAB SPEC 9	<input type="text"/>
SPEC 4	<input type="text"/>	LAB SPEC 10	<input type="text"/>
SPEC 5	<input type="text"/>	LAB SPEC 11	<input type="text"/>
SPEC 6	<input type="text"/>	LAB SPEC 12	<input type="text"/>
SPEC 7	<input type="text"/>	LAB SPEC 13	<input type="text"/>
	<input type="text"/>	LAB SPEC 14	<input type="text"/>

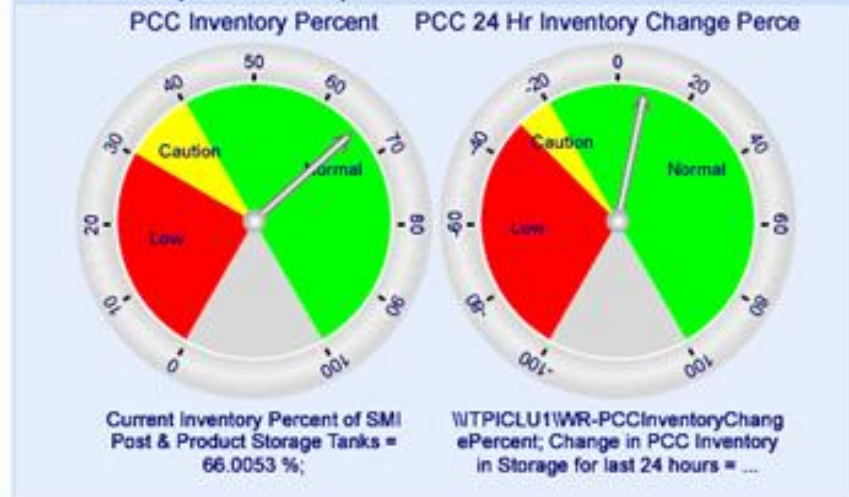
Comments:

Alerts and Task Assignments

Alerts

There are currently no active announcements. To add a new announcement, click "Add new announcement" below.

Wisconsin Rapids Inventory



SARA Reports

Name

There are no items to show in this view of the "SARA Reports" document library. To create a new item, click "Add new document" below.

Reports, Forms, & Manual Data Entry

- Document Forms
- Quality Data Entry

Tasks


Title	Assigned To
WR-DH3 Batch non-conformance	David Przelomski
WR-DH3 Batch non-conformance	David Przelomski
WR-DH1 Batch non-conformance	David Przelomski
WR-DH3 Batch non-conformance	David Przelomski

☐ Add new item



Excel Services

Minerals Technologies

 Minerals Technologies












All Sites

Minerals Technologies | Specialty Minerals | Minteq | Processed Minerals | Synsil | Environmental Health & Safety | Maintenance Practices | Policies & Procedures

Minerals Technologies > Excel Spreadsheets

Excel Spreadsheets

New | Upload | Actions | Settings

Type	Name	Modified
	Chillicothe CO2 Tracker2007	3/8/2007 11:55 AM
	Chillicothe Current Inventory	3/8/2007 12:00 PM
	Chillicothe Weekly Water Report	3/8/2007 11:56 AM
	Eastover CO2 Tracker2007	3/8/2007 10:26 AM
	Eastover Current Inventory	3/8/2007 10:38 AM
	Eastover Weekly Water Report	3/8/2007 10:36 AM
	Fuel History	3/15/2007 1:56 PM
	Test1	2/26/2007 4:58 PM
	Wisconsin Rapids CO2 Tracker2007	3/7/2007 3:21 PM
	Wisconsin Rapids Current Inventory	3/7/2007 3:09 PM
	Wisconsin Rapids Weekly Water Report	3/7/2007 3:20 PM

View All Site Content

Documents

- Shared Documents
- Excel Spreadsheets

Lists


- Calendar
- Tasks
- Locations
- Doc Types

Discussions

- Team Discussion

Search

Test

 Recycle Bin

Web Page to Excel

Minerals Technologies > Previous Page

Open
Update
Find

Open in Excel
Open a copy of the complete workbook in its current state in Excel.

Open Snapshot in Excel
Open a copy of this workbook in its current state containing only the values and formatting.

	Amount	UOM	Amount	UOM
12	MMT Silos			
13		Amount	UOM	
14	Silo 1	17	Tons	
15	Silo 2	0	Tons	
16				
17	Total	63	Tons	
18				
19				
20	PPP Tanks			
21		Amount	UOM	Product Code
22	Tank 1	17	kGal	LO
23	Tank 2	17	kGal	LO
24				
25	Total	22	kGal	
26				
27				
28	Finished Inventory by Product Type			
29	LO	32	kGal	32 dry tons approx.
30				
31	HO	0	kGal	0 dry tons approx.
32				
33	Albafil	0	kGal	0 dry tons approx.
34				
35				
36				
37	Total	92	kGal	32 dry tons approx.
38		31%	of Full (Post Tanks & Product Tanks)	

Product Summary - Current Inventory					
Reactor					
	Amount	UOM	Amount	UOM	Product Code
k 1	17	kGal			LO
k 2	17	kGal			LO
k 3	17	kGal			LO
Total	33	kGal			
ZZZ Tanks					
	Amount	UOM	Amount	UOM	Product Code
ZZZ Tank 1	17	kGal	7.7	dry tons approx.	LO
ZZZ Tank 2	17	kGal	17.0	dry tons approx.	LO
Total	76	kGal	10	dry tons approx.	
MMM Tanks					
	Amount	UOM	Amount	UOM	Product Code
MMM1	17	kGal	22	dry tons approx.	LO
Total	17	kGal	22	dry tons approx.	
Inventory by Tankage					
Reactor	17	kGal			
ZZZ Tanks	17	kGal			
MMM Tanks	17	kGal			
Sub Total	130	kGal			
OOO Tanks	17	kGal			
Total	147	kGal			

Contacts

- Jim Cummins, Specialty Minerals Inc.
 - ▶ Jim.Cummins@mineralstech.com
- Mike Purcell, Omicron
 - ▶ mpurcell@omicron.com

VOYAGE2007



***Thank
You***