
REAL-TIME PERFORMANCE MANAGEMENT FOR THE ENTERPRISE
RtPM
SAN FRANCISCO PHILADELPHIA HOUSTON FRANKFURT
OSISOFT USER CONFERENCES 2005
REAL-TIME PERFORMANCE MANAGEMENT FOR THE ENTERPRISE
RtPM

Product Data Management Made Easy Using ProcessPoint

Ray Hall

Outline

- Product Data Management
- What is ProcessPoint
- Business Example: Dow Reichhold
- RtPM Integration
- Summary

Product Data Management , also known as:

Product Lifecycle Management

Recipe Management

Product & Process Specification

Batch Specification

Grade Management

Limit, Target Management (PI)

Product Data Management Challenge

- Product quality and consistency, and process efficiencies, depend on managing lots of data
  - Formulations, Recipes, Bills of material
  - Quality, Packaging, Nutritional, Regulatory specifications
  - Manufacturing process steps and instructions
  - Process Targets, Limits
  - Tag Specifications
    - Limits
    - Targets

Data Management often involves workflow:

Product

Design → Lab → Pilot → Produce → Improve

Process

Typical Project Goals

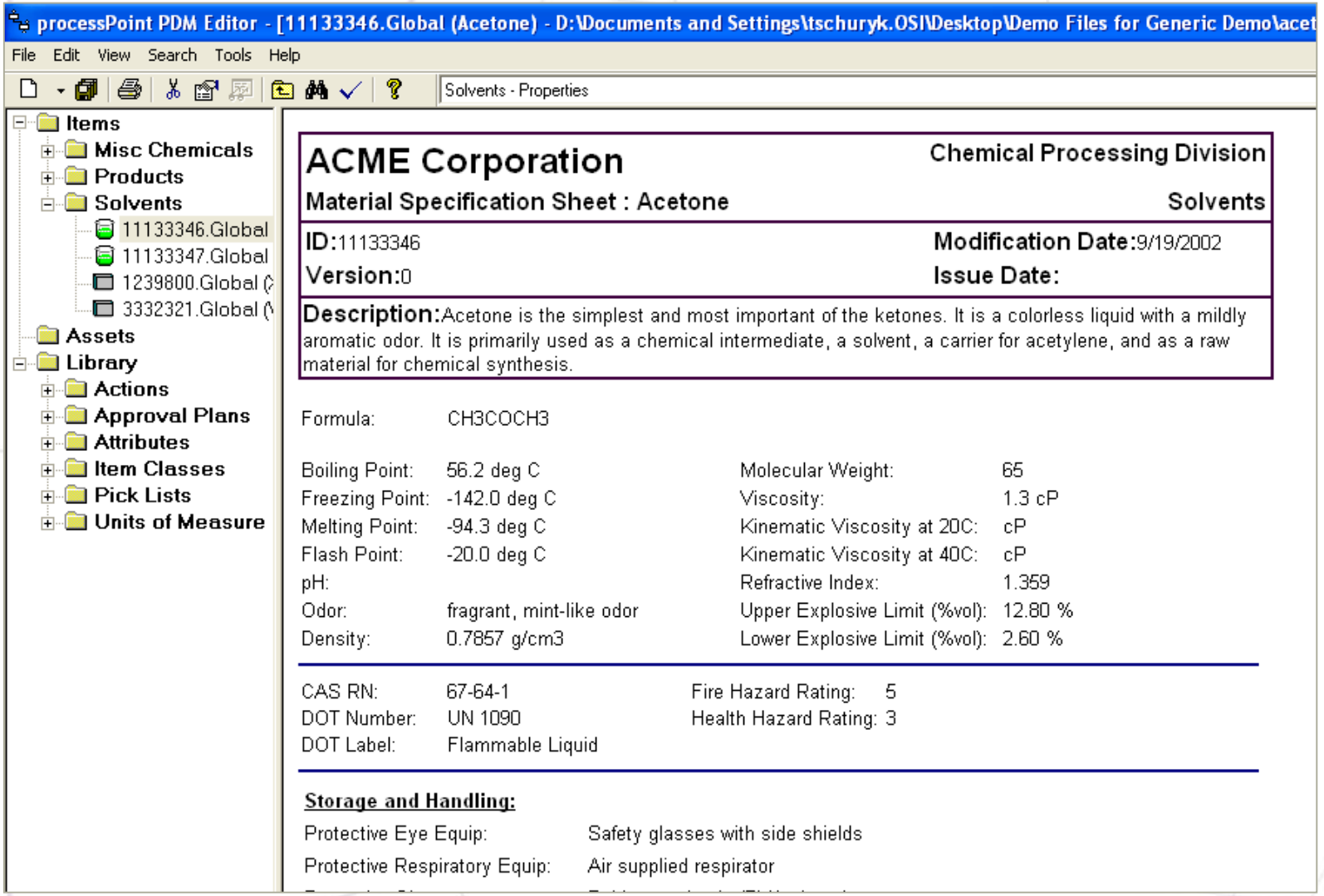
- Enhanced product quality
- Reduced product cost
- Quicker time to market
- Find the right specification
- Process Optimization
- Product consistent to customer spec
- Systematized regulatory compliance
- Manufacturability

The advantage of consolidated specification information:

What systems have our:

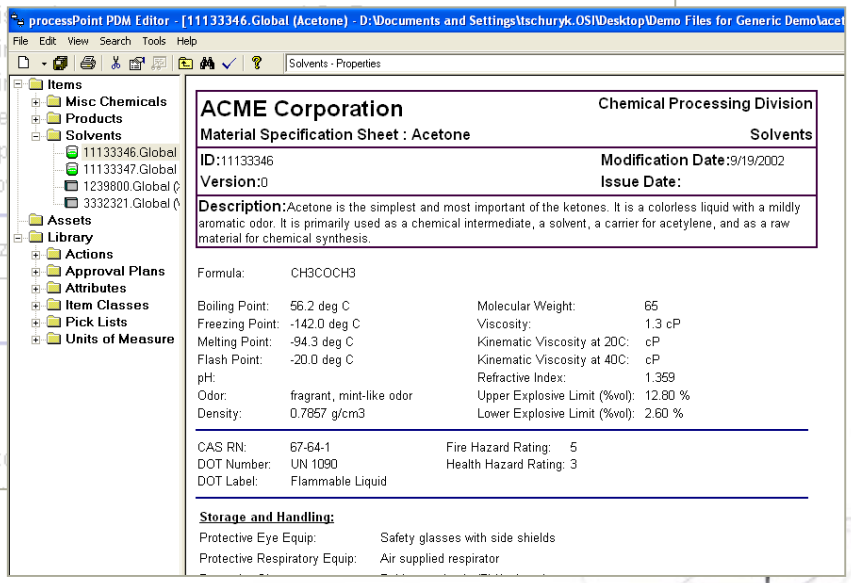
- Specifications?
- Recipes?
- Control limits?
- Product attributes?
- Process targets?
- Process documentation?
- SOPs?

The Power of a packaged System for Specifications



The Power of a packaged System for Specifications

- Up-to date
- Approved
- Organized and Displayed the way I want
- Comprehensive
- Integrated into PI



Product Data Management Benefits

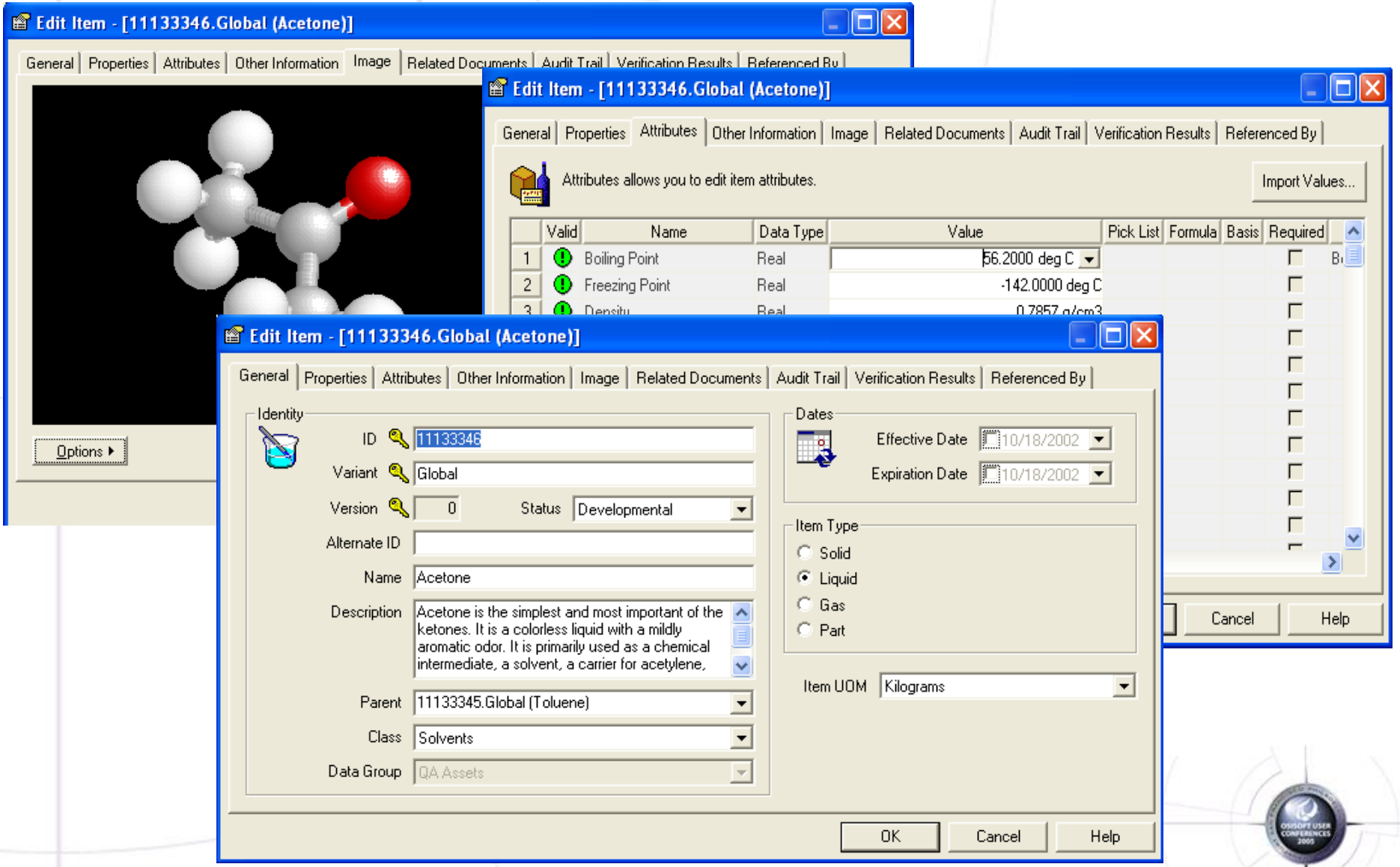
- Increase product quality
  - Consistent product specifications across manufacturing sites
  - Visibility of specification data on real-time displays, product based alarming
- Increase product consistency through one version of the truth
  - R&D Centers, Manufacturing Sites, Marketing and Sales all access the same set of product specifications
- Improve employee efficiency
  - Spend more time developing products and less time managing the process
- Increase revenue
  - Decrease time to market for new products and updates to existing products

What is ProcessPoint

Introducing ProcessPoint

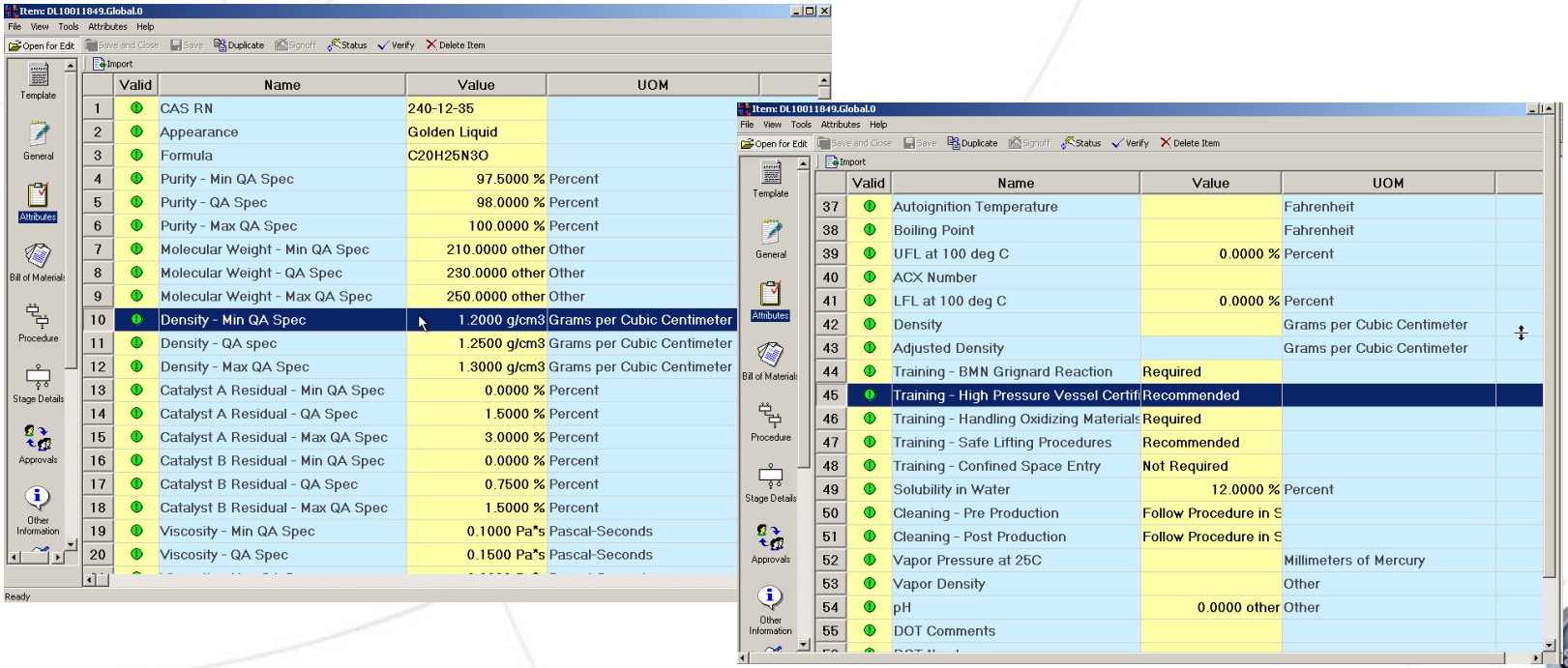
- Comprehensive product specification database
- A structured environment for development and ongoing management of products
- System of record for pre-process information
  - Product properties
  - Quality limits
  - Product parts
  - Manufacturing procedures
  - Product history
  - Approval and electronic signoffs

ProcessPoint: Specification Management

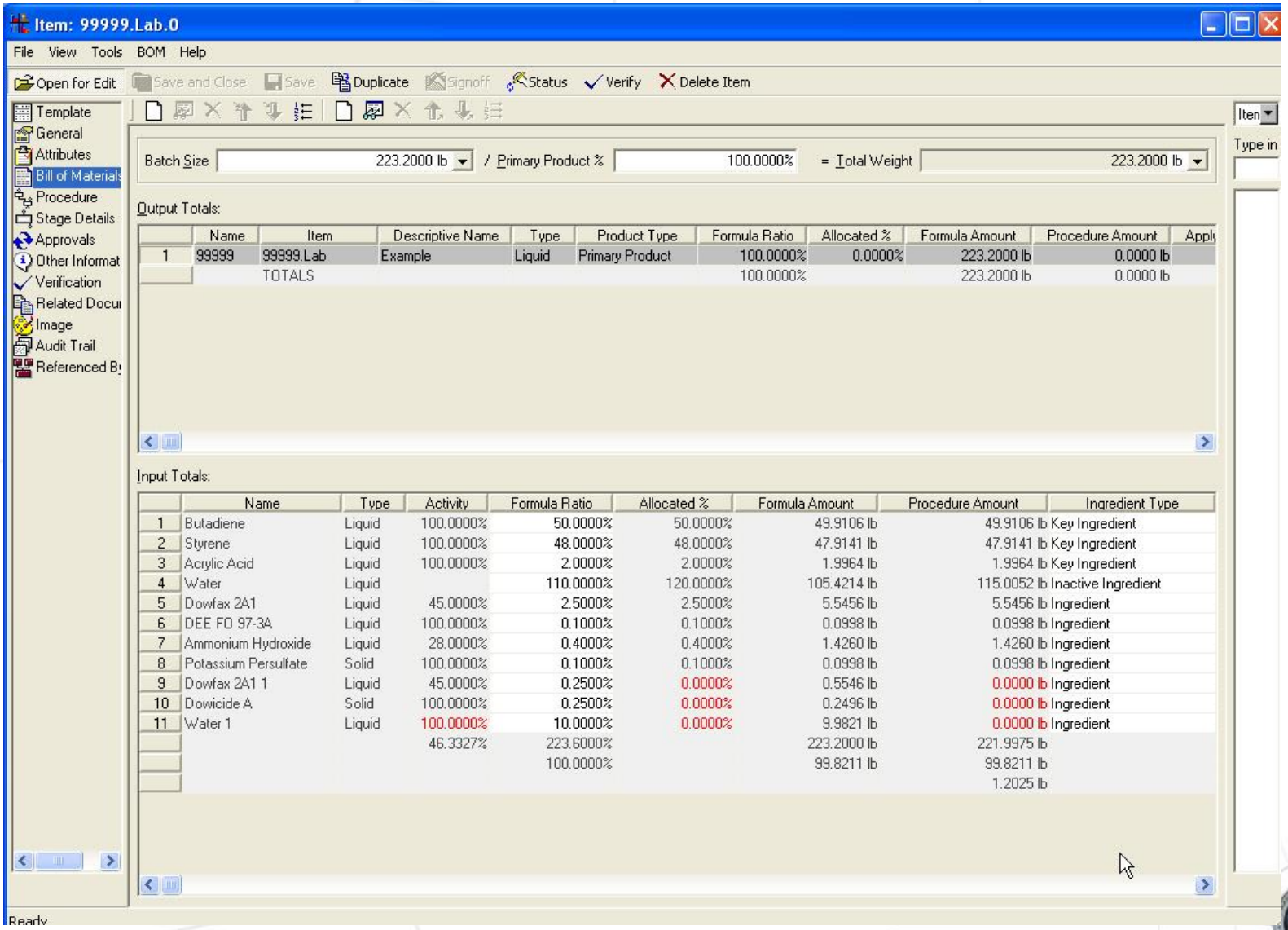


Configurable Data Model

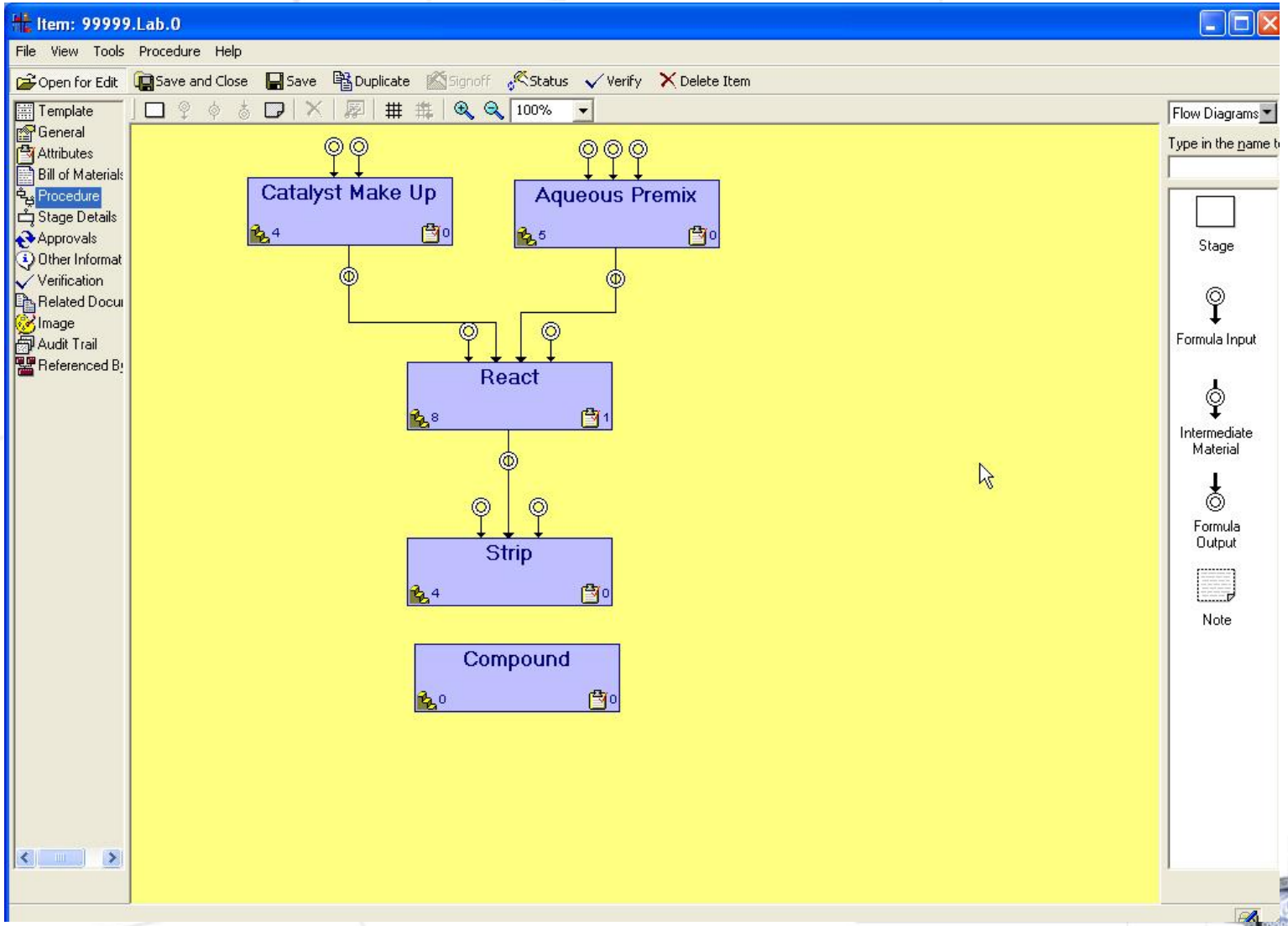
- Users define the attributes or specs that are important to their business
  - i.e. Product Properties, Process Parameters, Quality Parameters, Environmental and Safety Information, Cleaning Requirements



Bill of Material



Procedure



Procedure – Stage Details

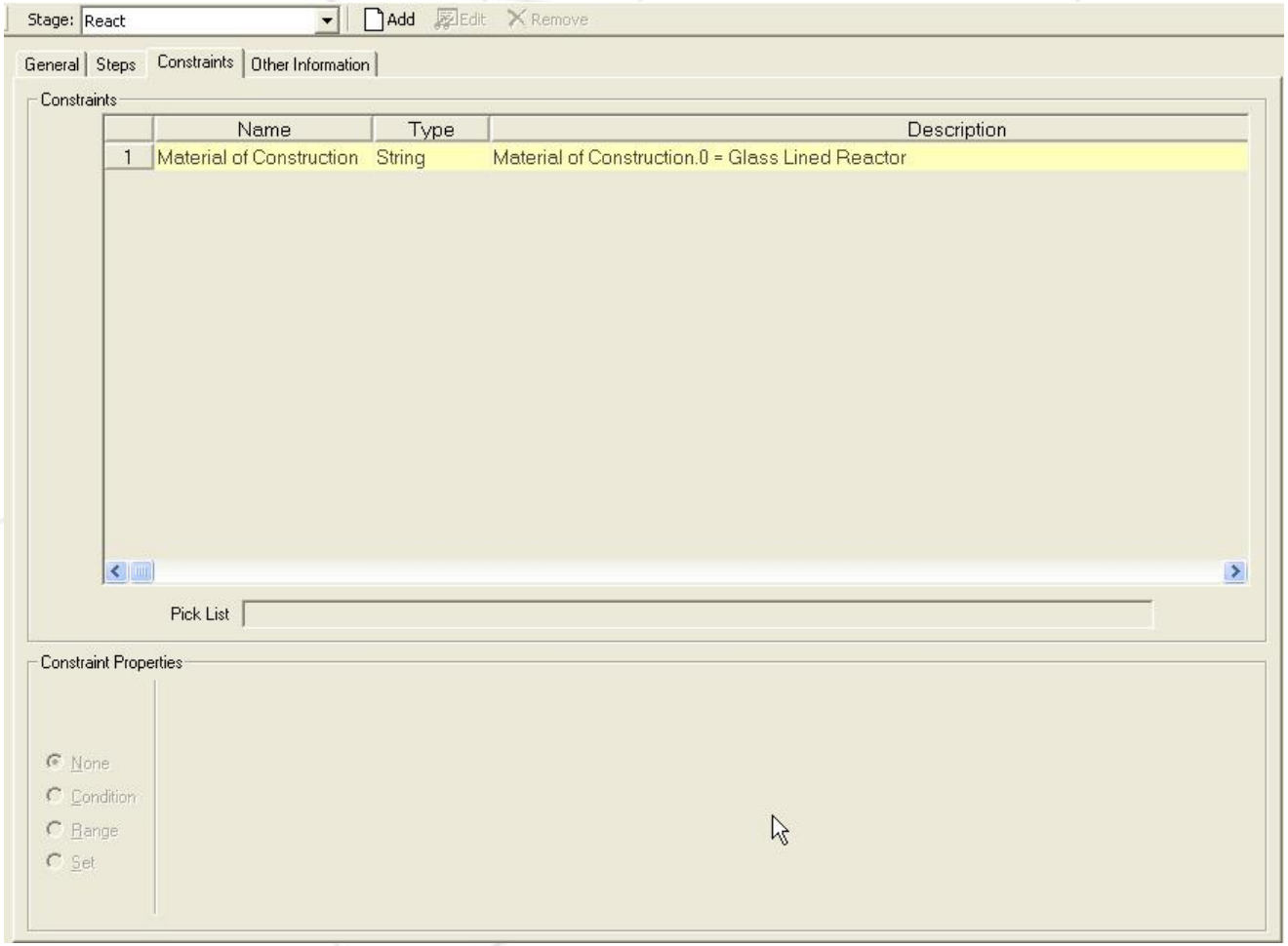
Stage: React

General | Steps | Constraints | Other Information

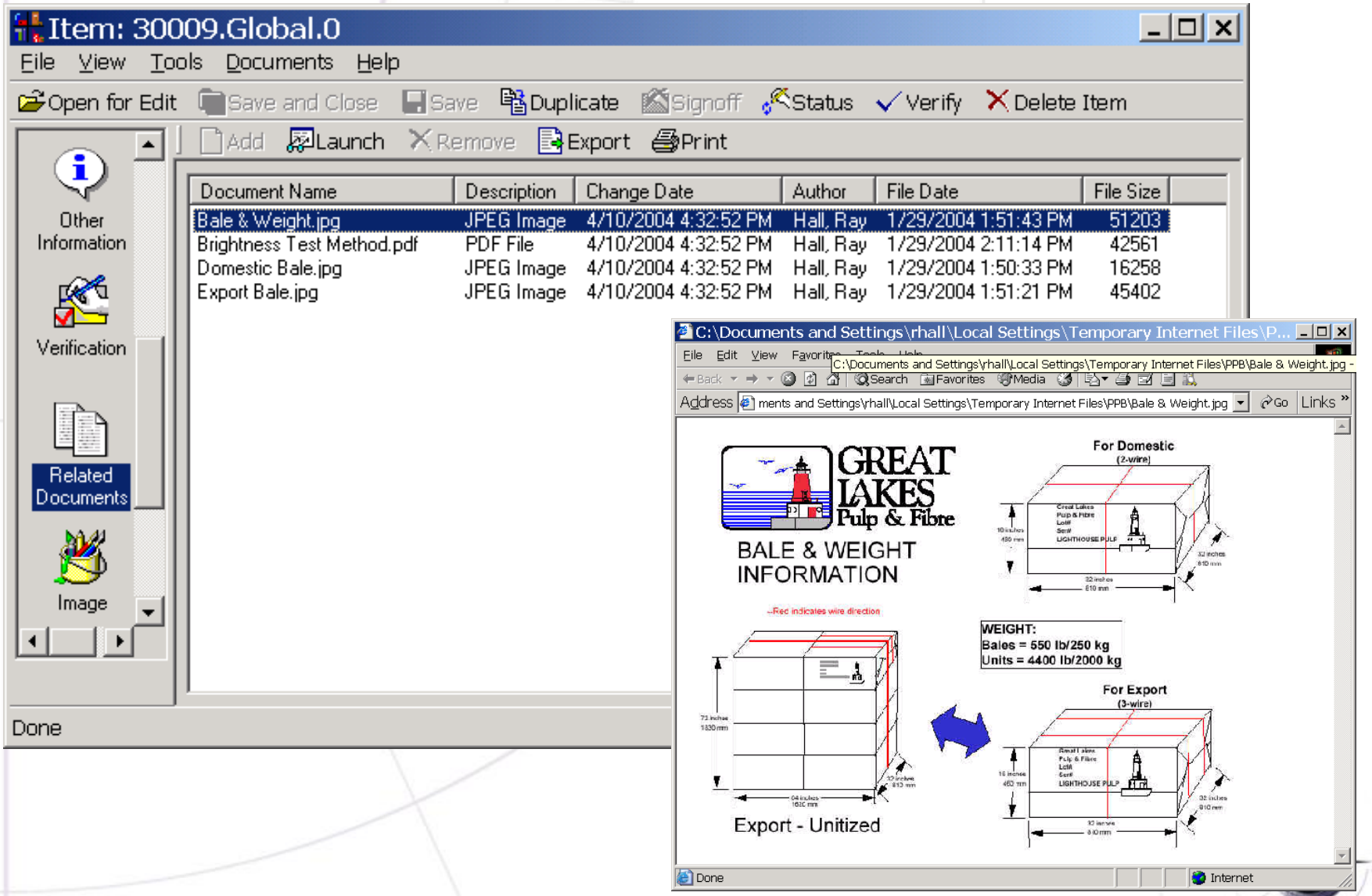
	Order	Path	Action	Formula	Material	Allocated	Value	Descr
1	⇩	0	Intermediate Input		Intermediate_Material		84.6614 lb	
2	⇩	0	Agitate				5.0000 min	
3	⇩	0	Temperature				140.0000 deg F	
4	⇩	1	Feed	Styrene	Styrene.DR	48.0000%	47.9141 lb	Feed over 360 minutes
5	⇩	2	Feed	Butadiene	Butadiene.DR	50.0000%	49.9106 lb	Feed over 360 minutes
6	⇩	3	Intermediate Input		Intermediate_Material		38.6529 lb	Catalyst feed over 60 minutes
7	⇩	0	Temperature				180.0000 deg F	
8	⇩	0	Intermediate Output		Intermediate_Material		221.3143 lb	

Procedure – Step Parameters

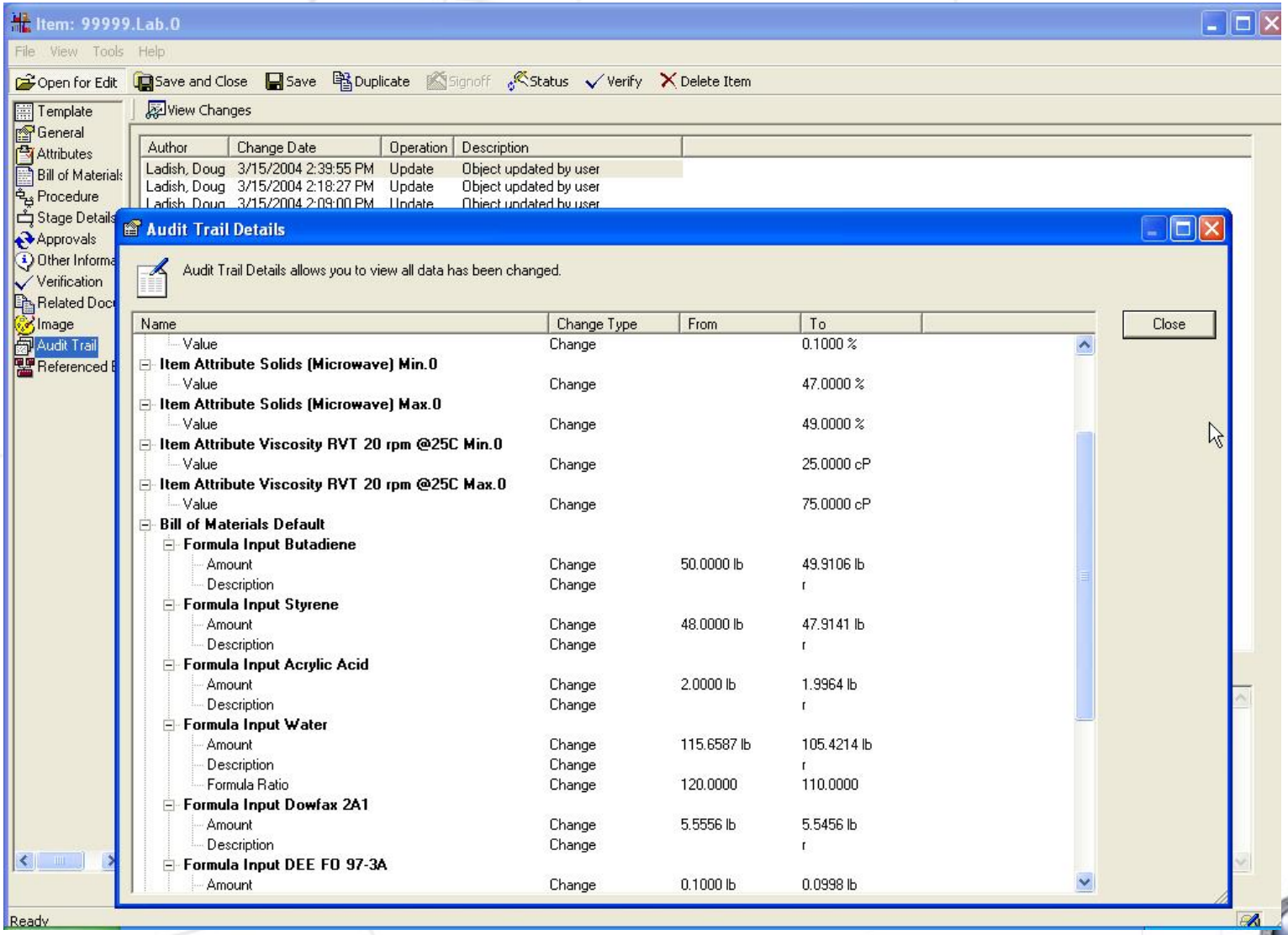
Procedure – Stage Constraints



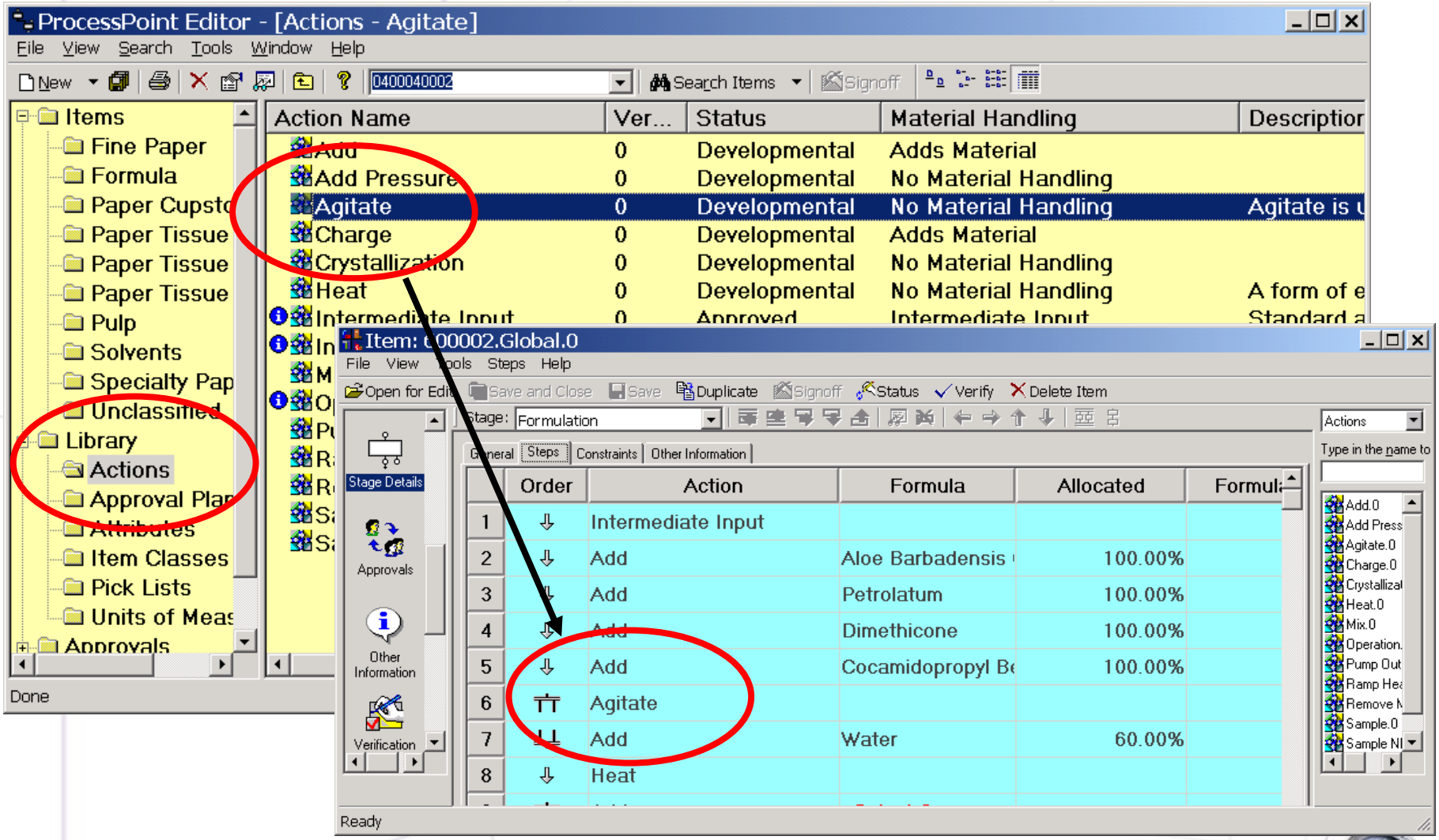
Attached Documents



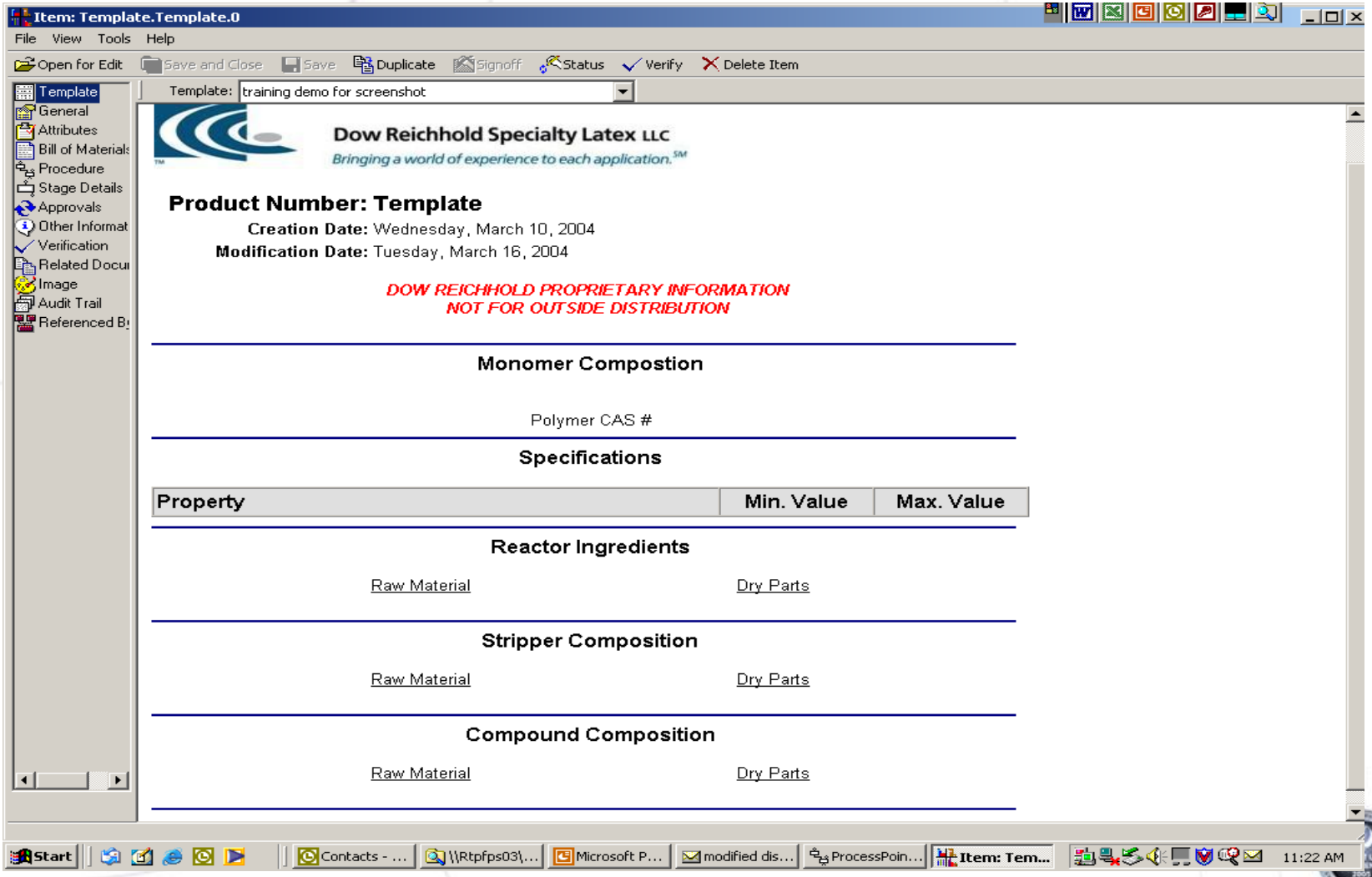
Audit Trail with Details Shown



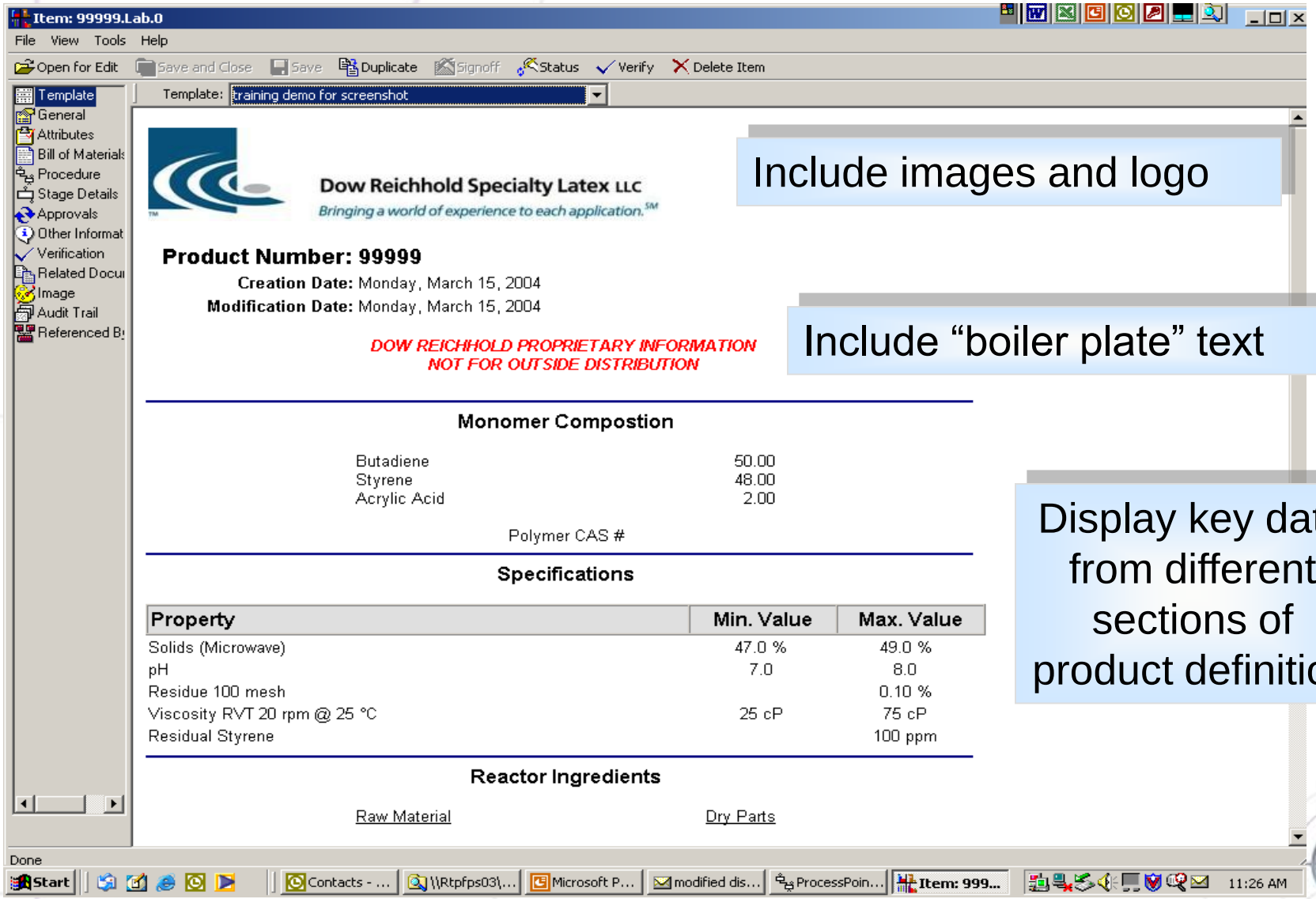
Library of Building Blocks



Role-Based Displays



Sample Role-Based Display

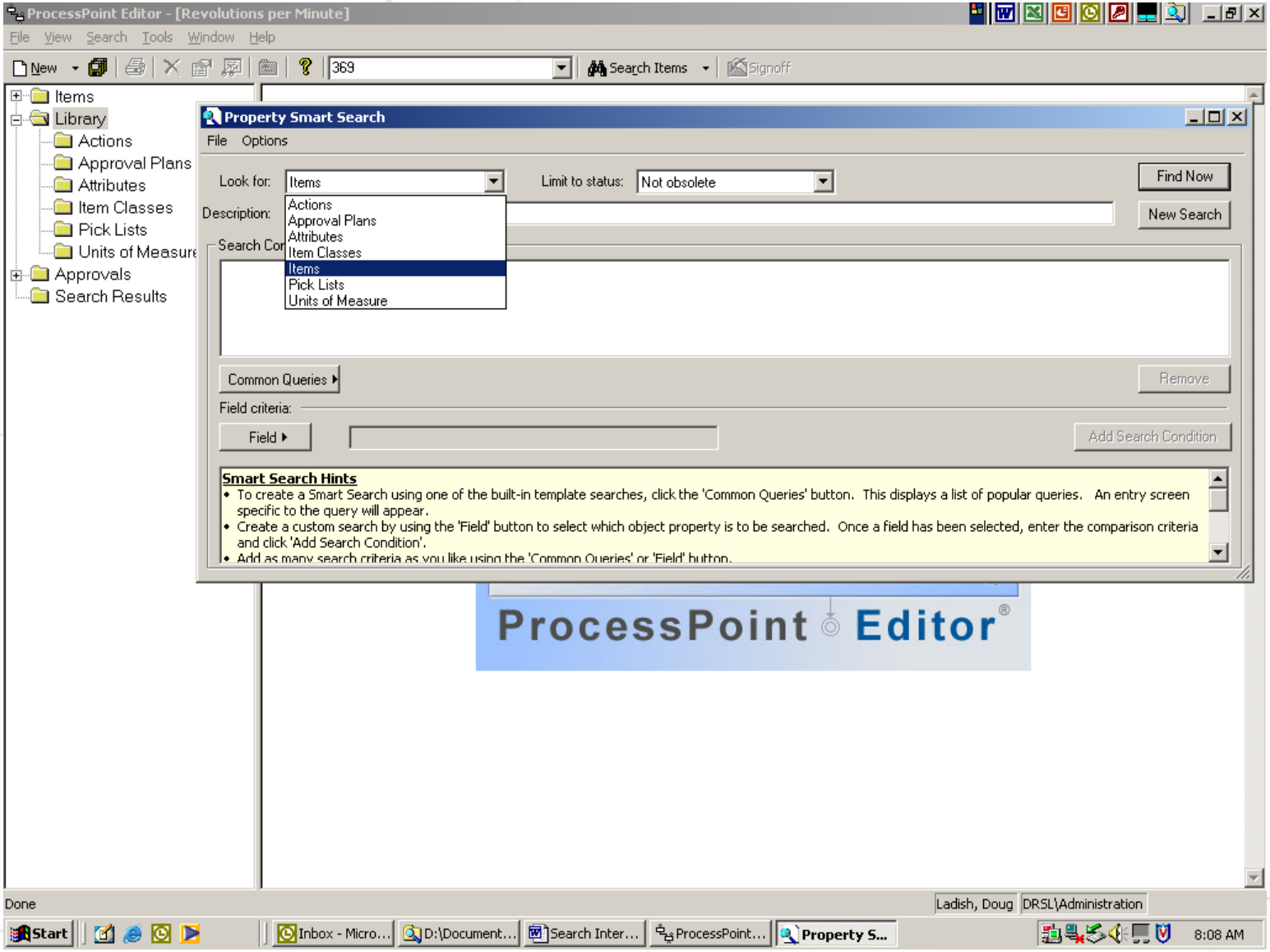


Include images and logo

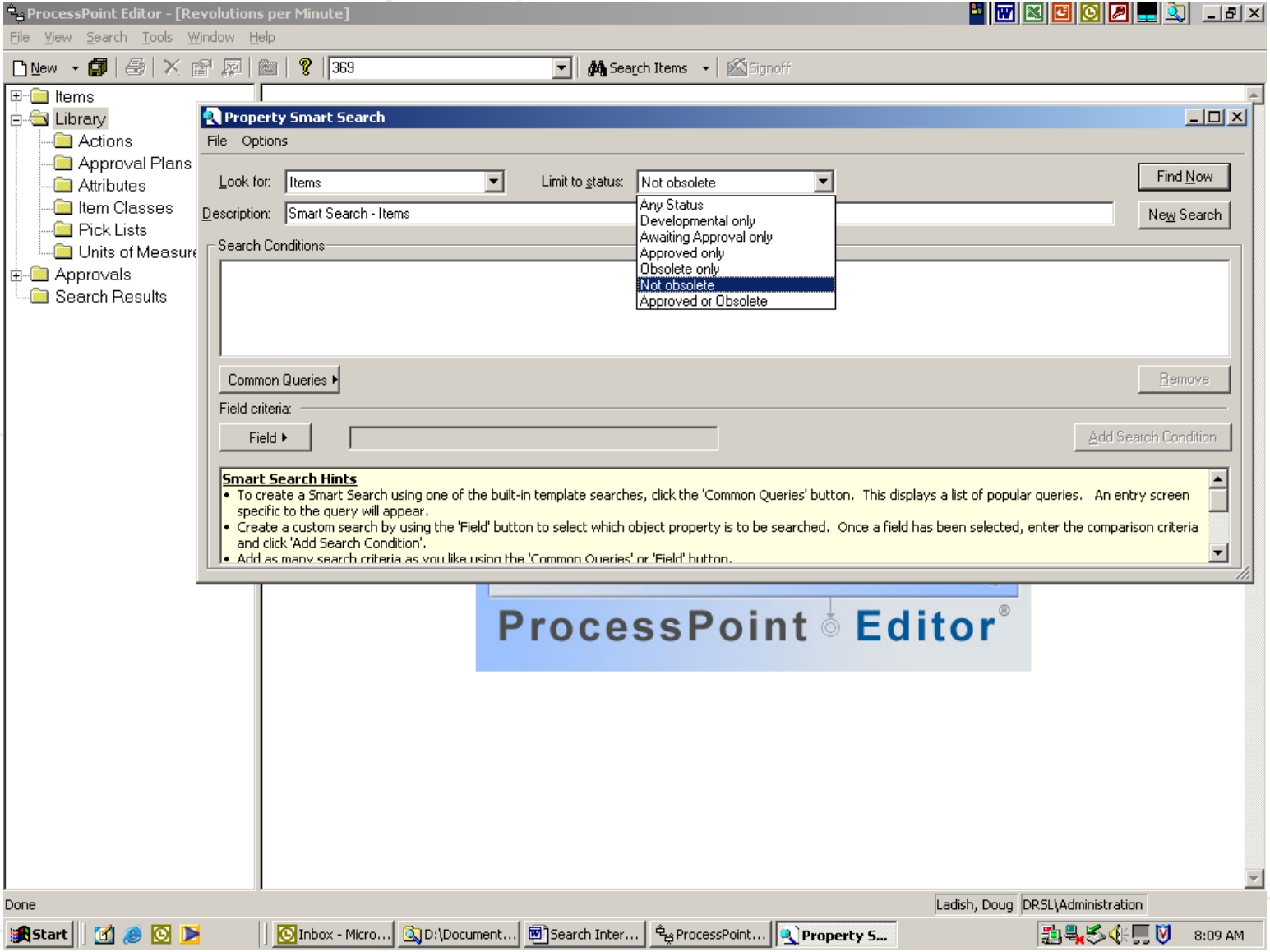
Include “boiler plate” text

Display key data from different sections of product definition

Search Capabilities



Search Capabilities



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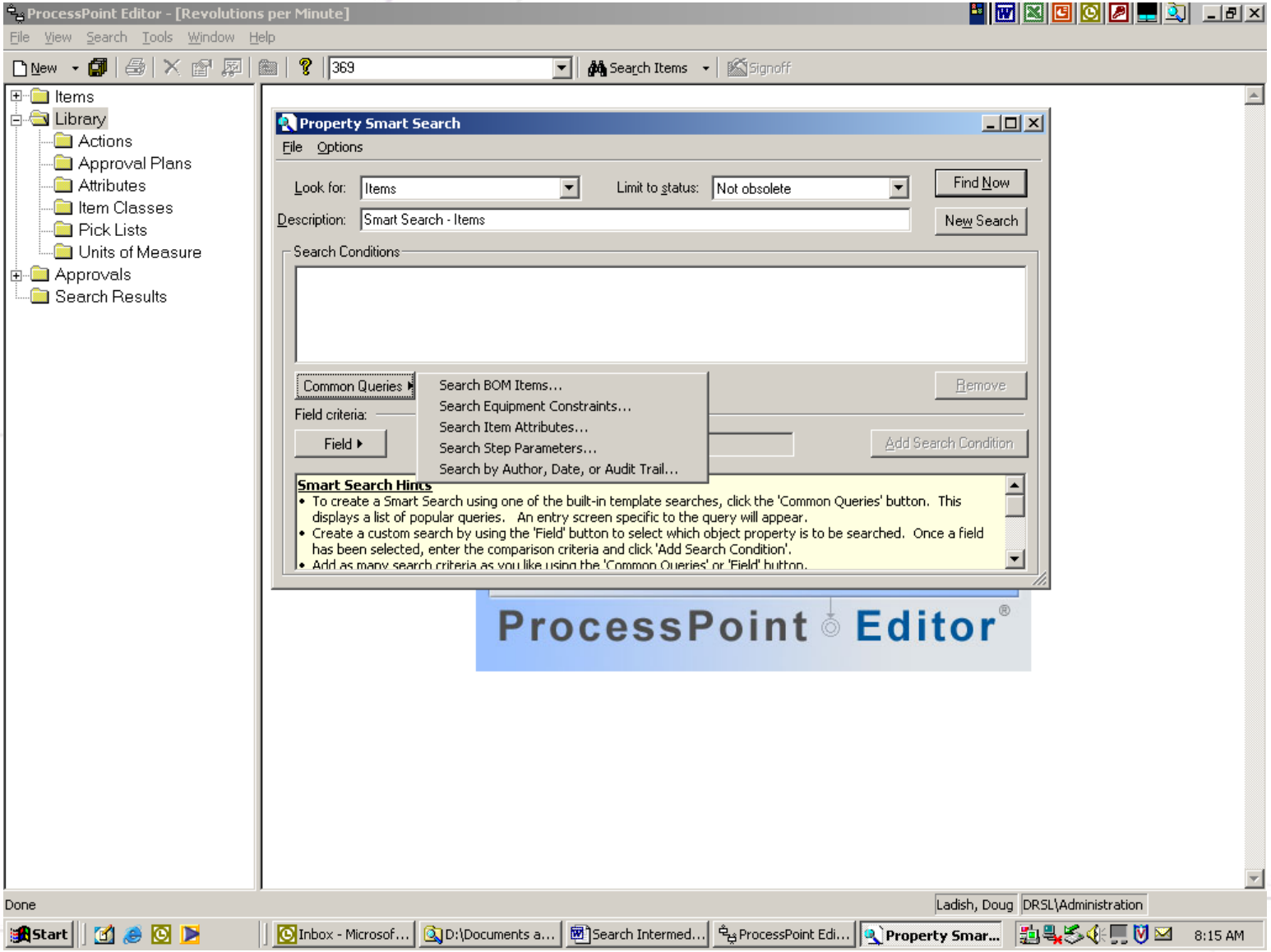

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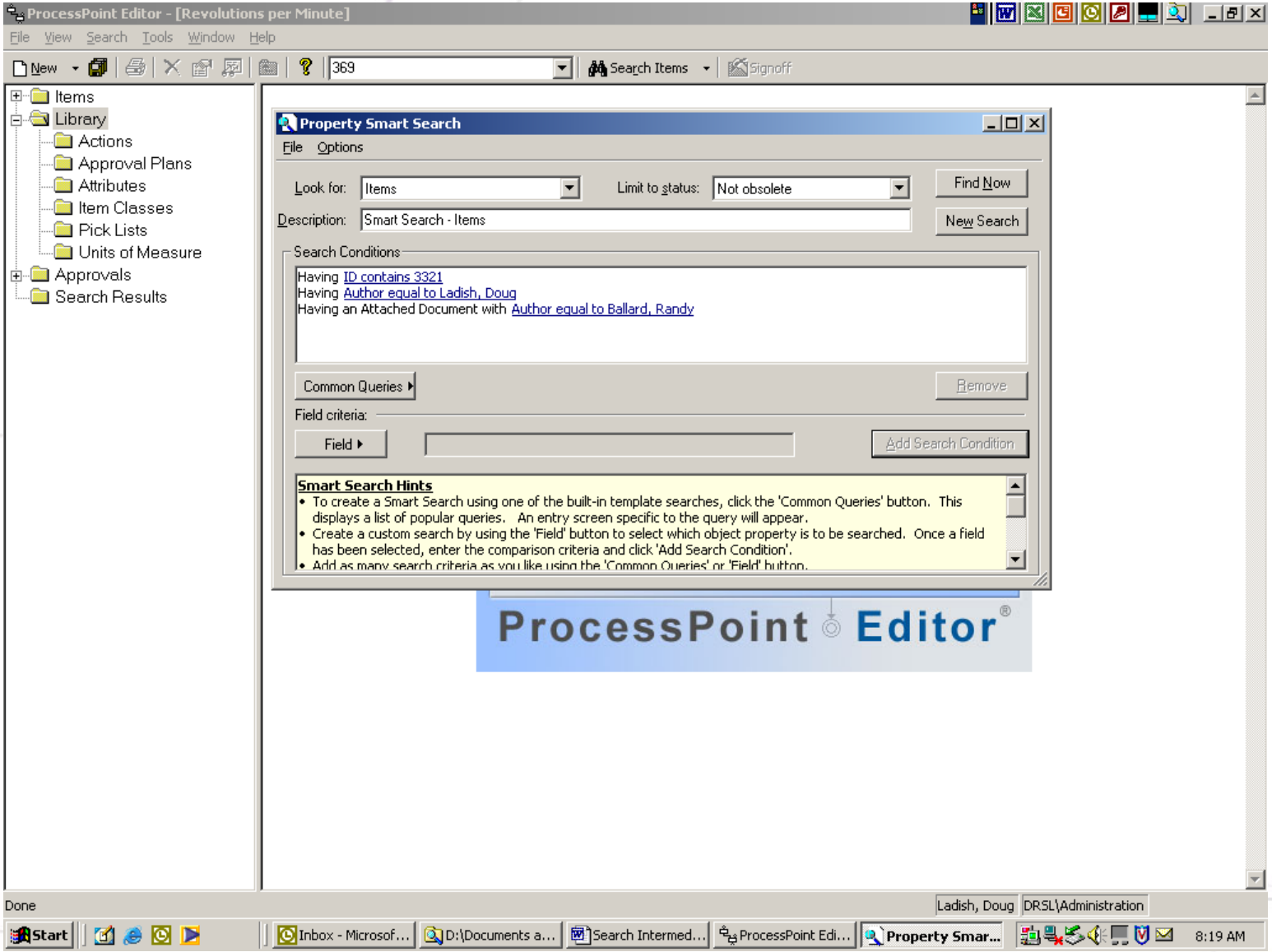

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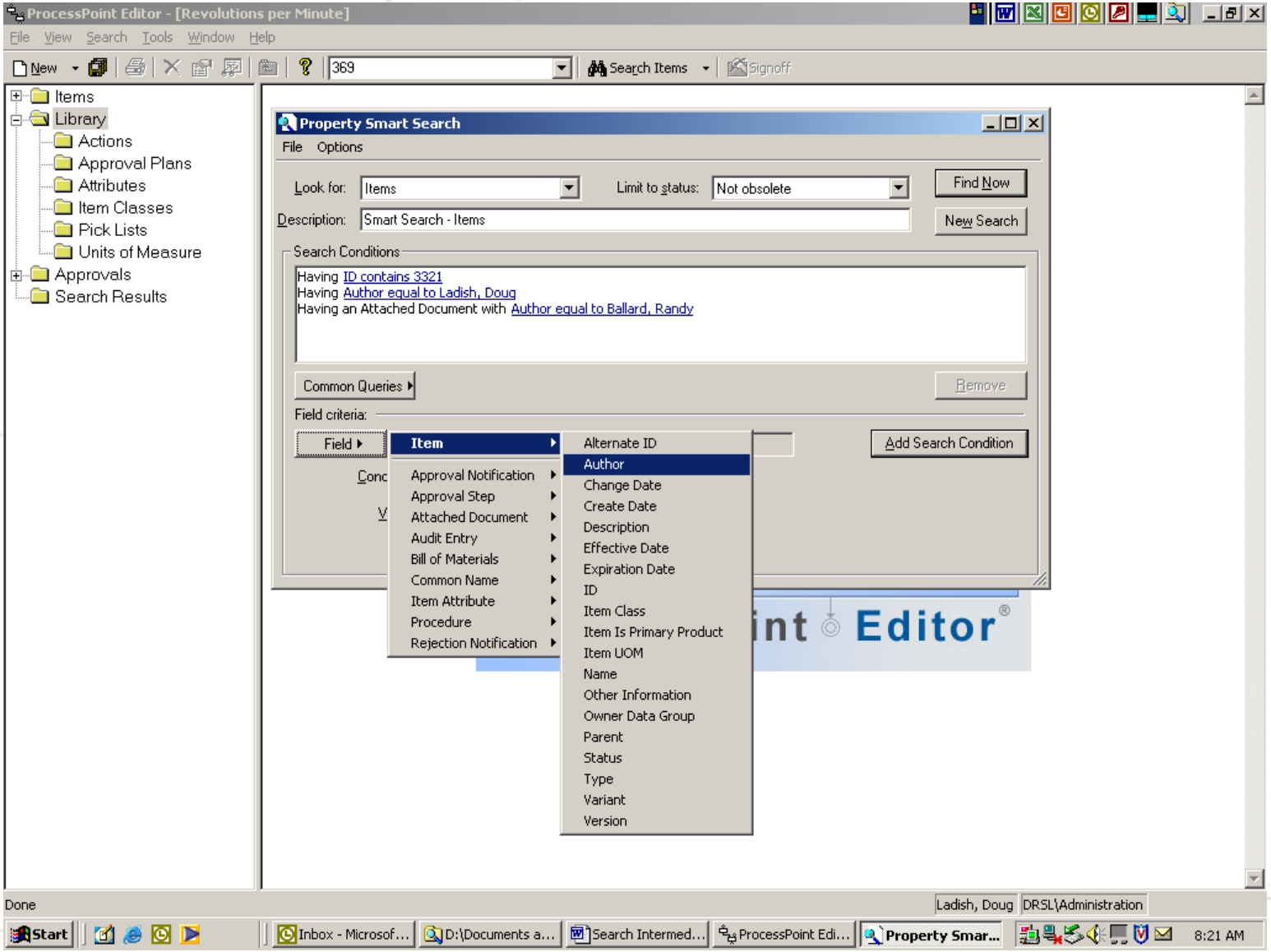

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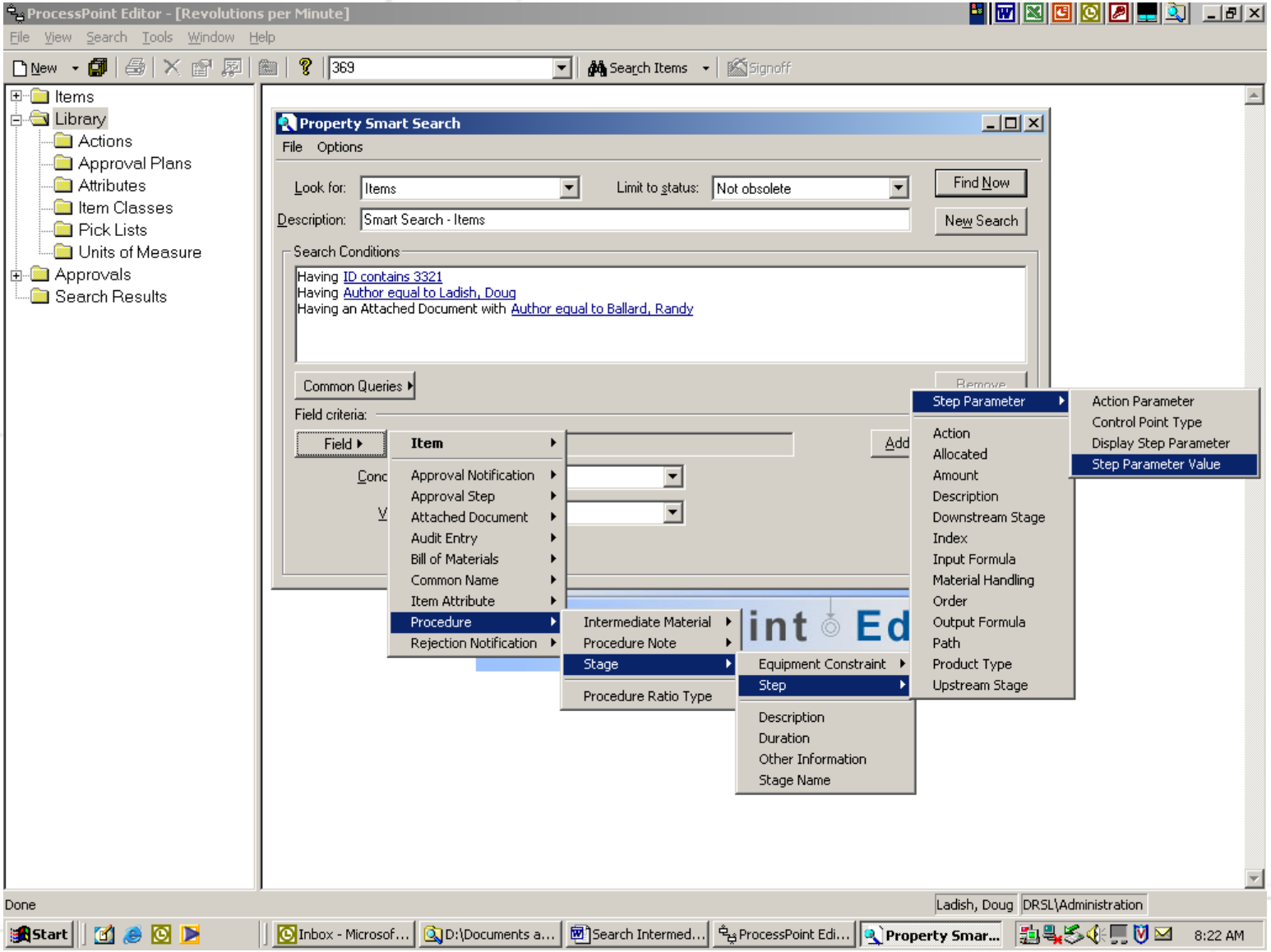

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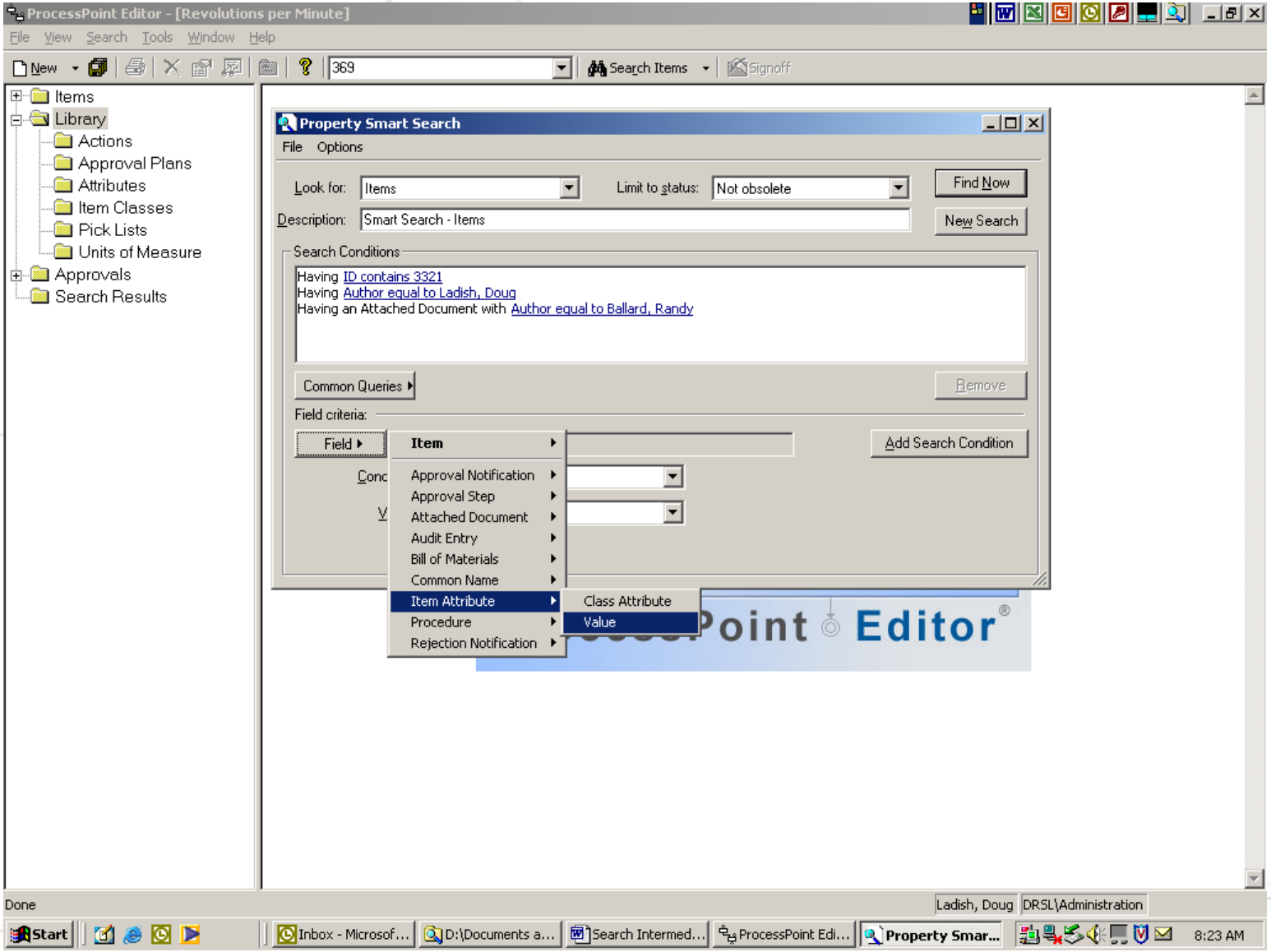

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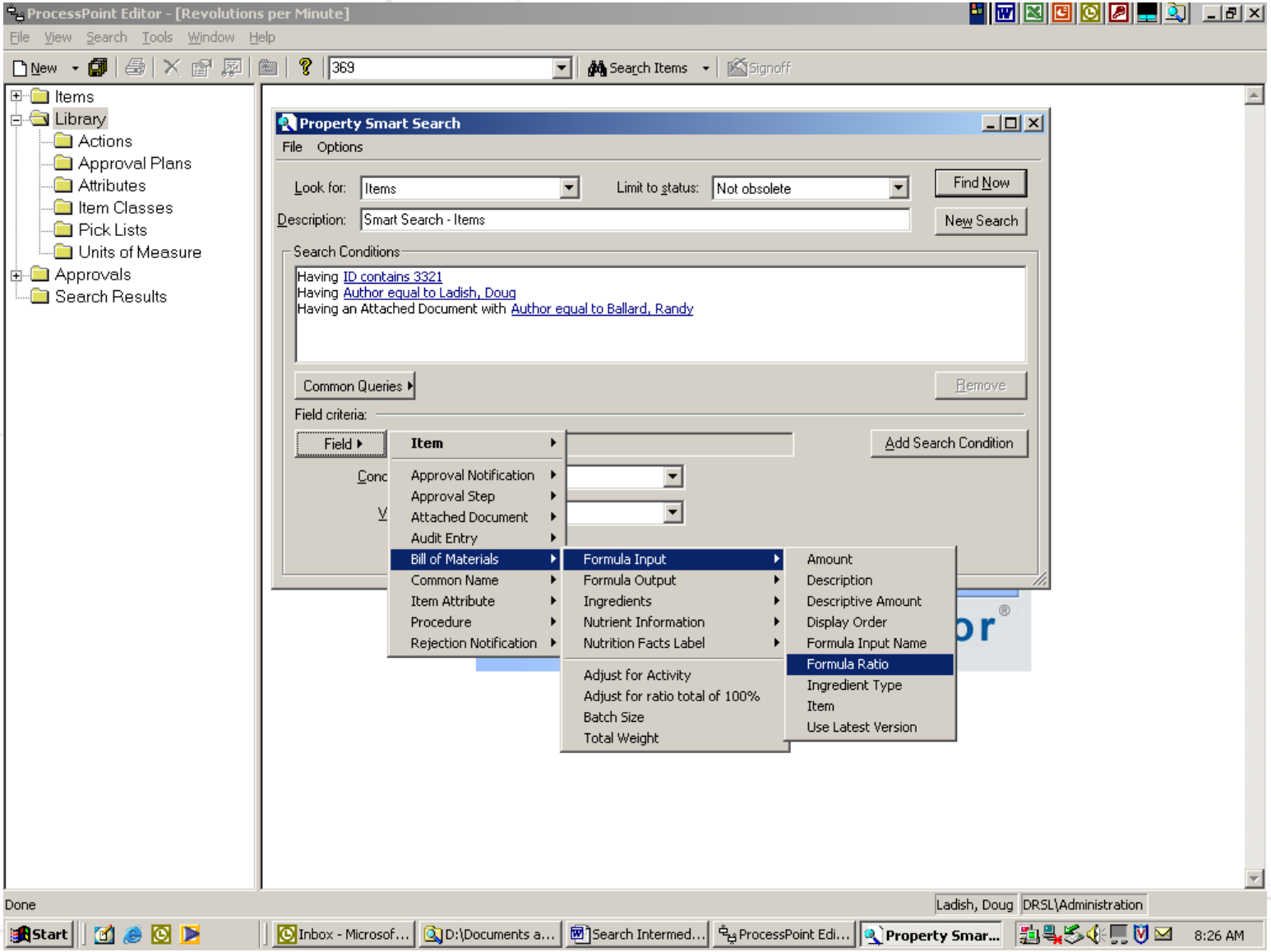
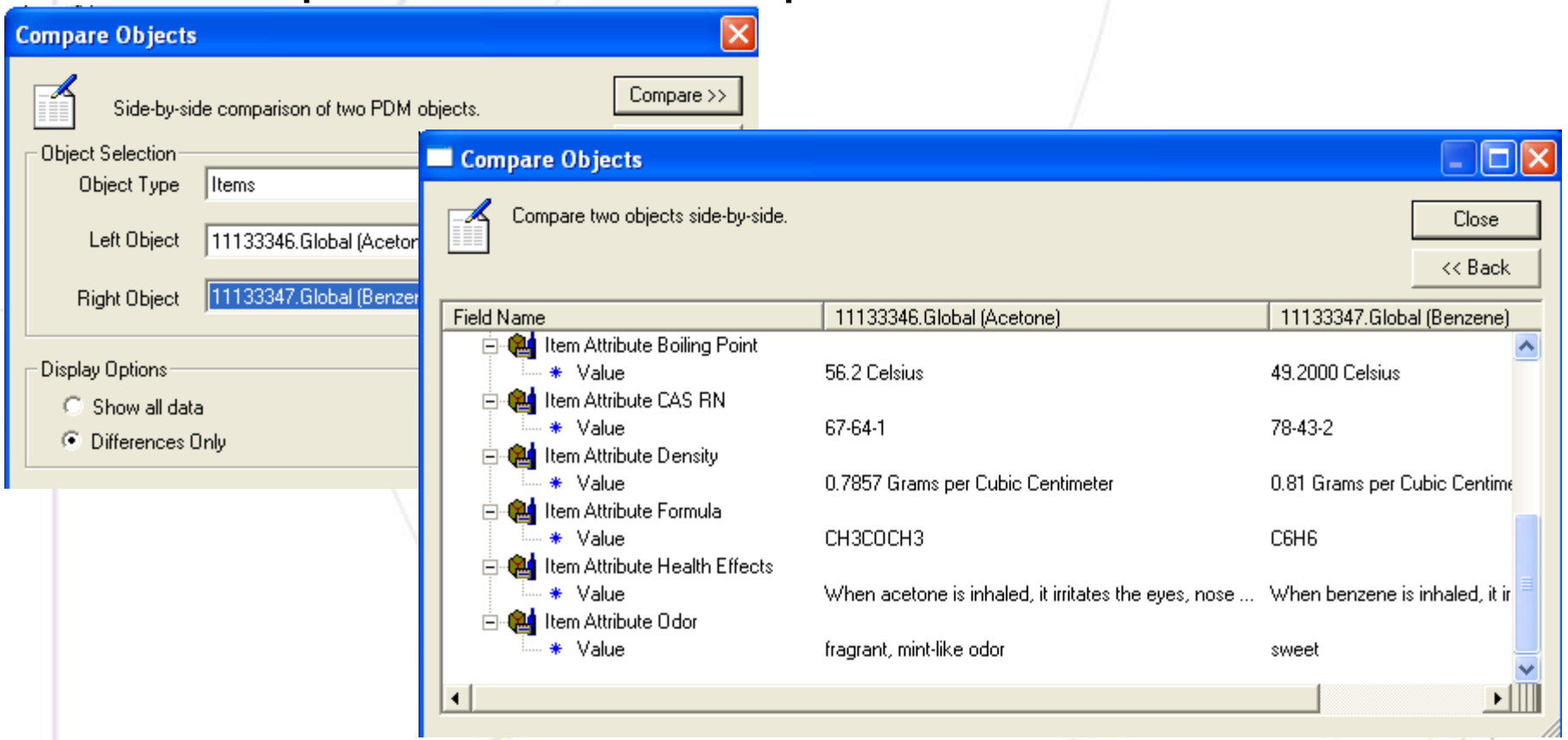


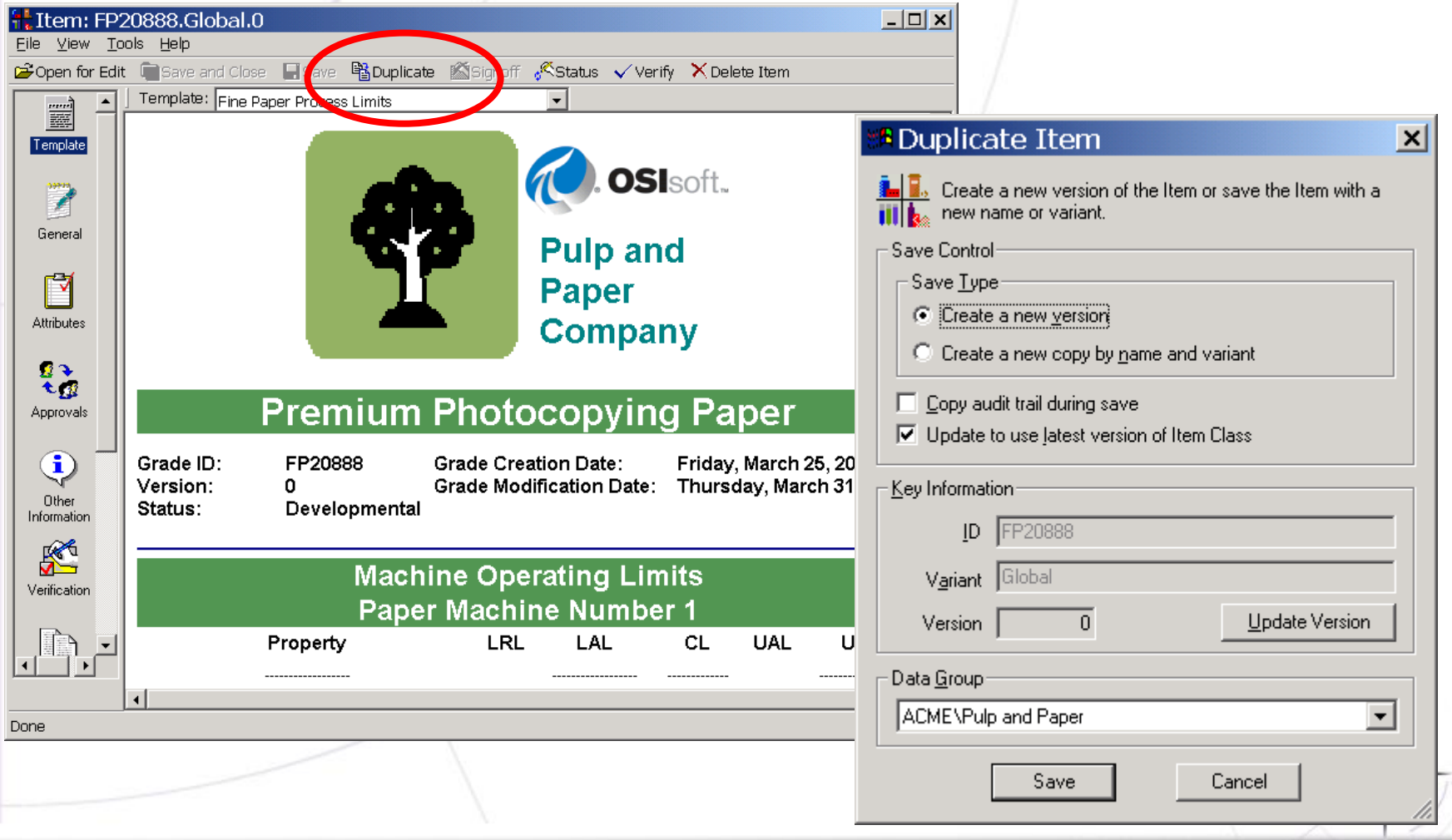
Product Comparisons

- Side by side comparisons allow users to easily compare materials or products



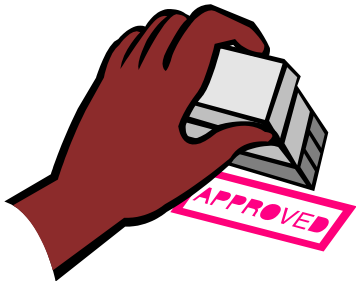
Product Duplicate

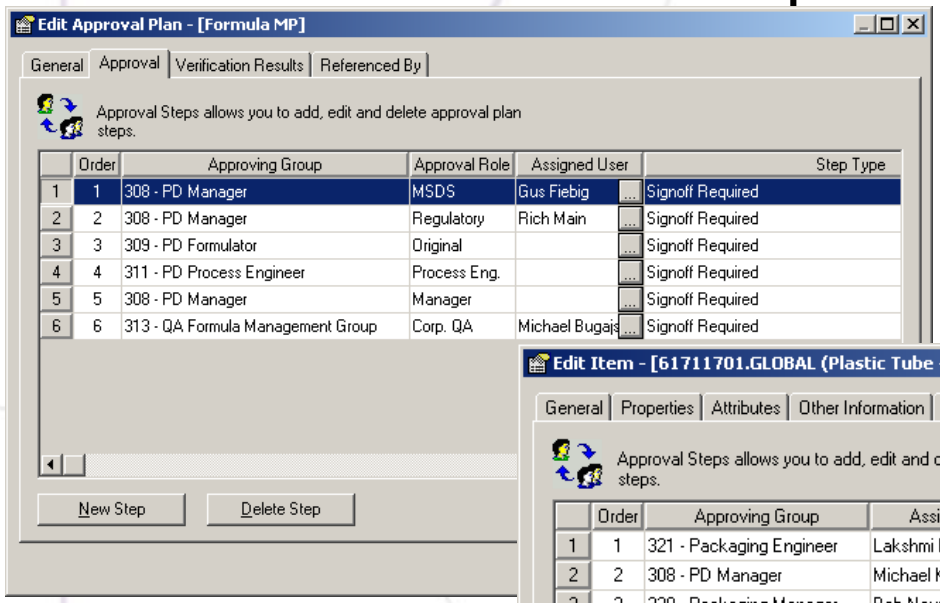
- Duplicate an entire product record and all associated information.

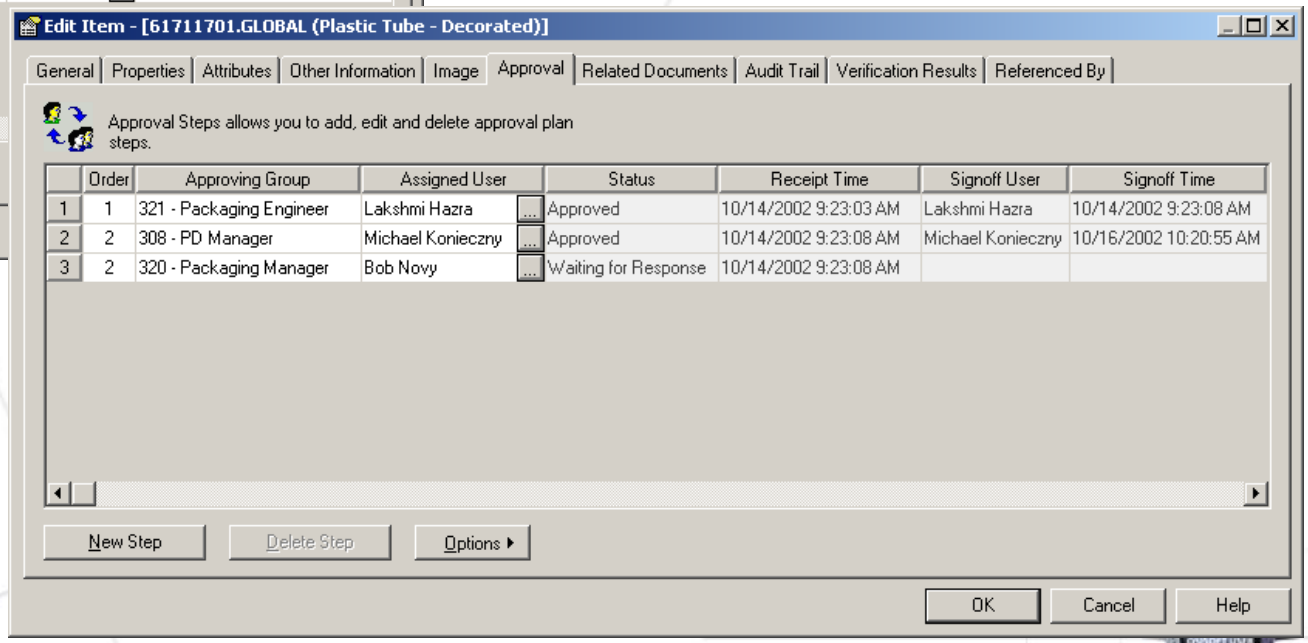


Electronic Approvals

- Users can create route plans, and automatically route

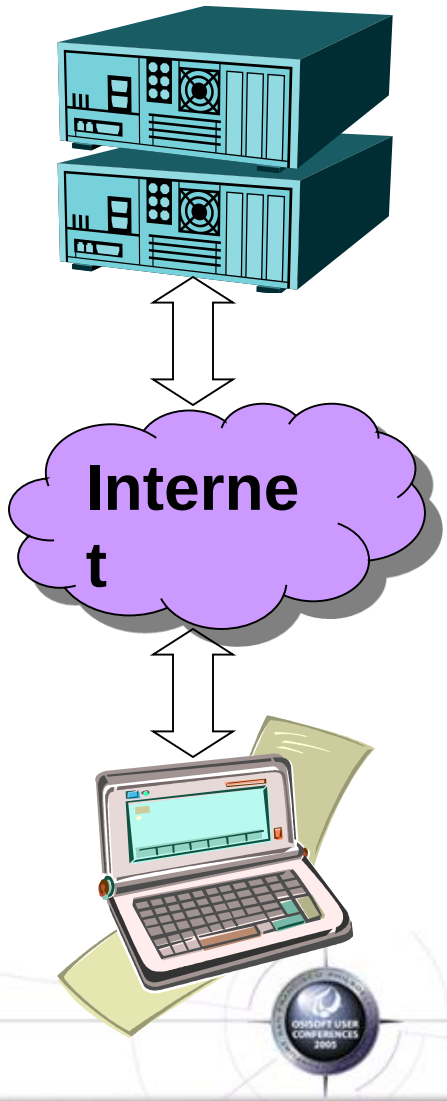






Smart Client and Internet Access

- ProcessPoint covers the complete breadth of the new product innovation cycle from initial concept to shippable product with:
  - ProcessPoint Server - central web services data repository that is used to capture the knowledge about a company's products
  - ProcessPoint Client – client-based tools that capture the data about a company's products and enhance the way this information is shared
  - ProcessPoint Tools – client-based tools that enable the implementation and commissioning of ProcessPoint, including bulk loading, display authoring and administration



ProcessPoint is:

- Comprehensive product and process specification database
- System of record for pre-process information
  - Product properties
  - Quality limits
  - Raw materials
  - Manufacturing procedures
  - Product history
- Rich management tools
  - Approval and electronic signoffs
  - Audit trail
  - Versioning
  - Multi-department security
  - Compare, duplicate, etc.
- Provides PI Point limits, targets to PI clients

Business Example: Dow Reichhold

Dow Reichhold Specialty Latex

- 50/50 joint venture of The Dow Chemical Company and Reichhold, Inc. (DRSL)
- Formed in January 2002
- World's largest producer of specialty latex
- Develops customized technologies & products
- Innovation, speed and teamwork are key elements of the DRSL business model

Locations

- Headquarters and Research & Development
  - Research Triangle Park, NC
- Primary Manufacturing Locations
  - Cheswold, Delaware
  - Kensington, Georgia
- Other Manufacturing
  - North America , Europe
  - Latin America , Asia/Pacific Region

Products

- Polymer Types
  - Styrene Butadiene
  - Nitriles
  - Acrylates
  - Specialty Co-Polymers

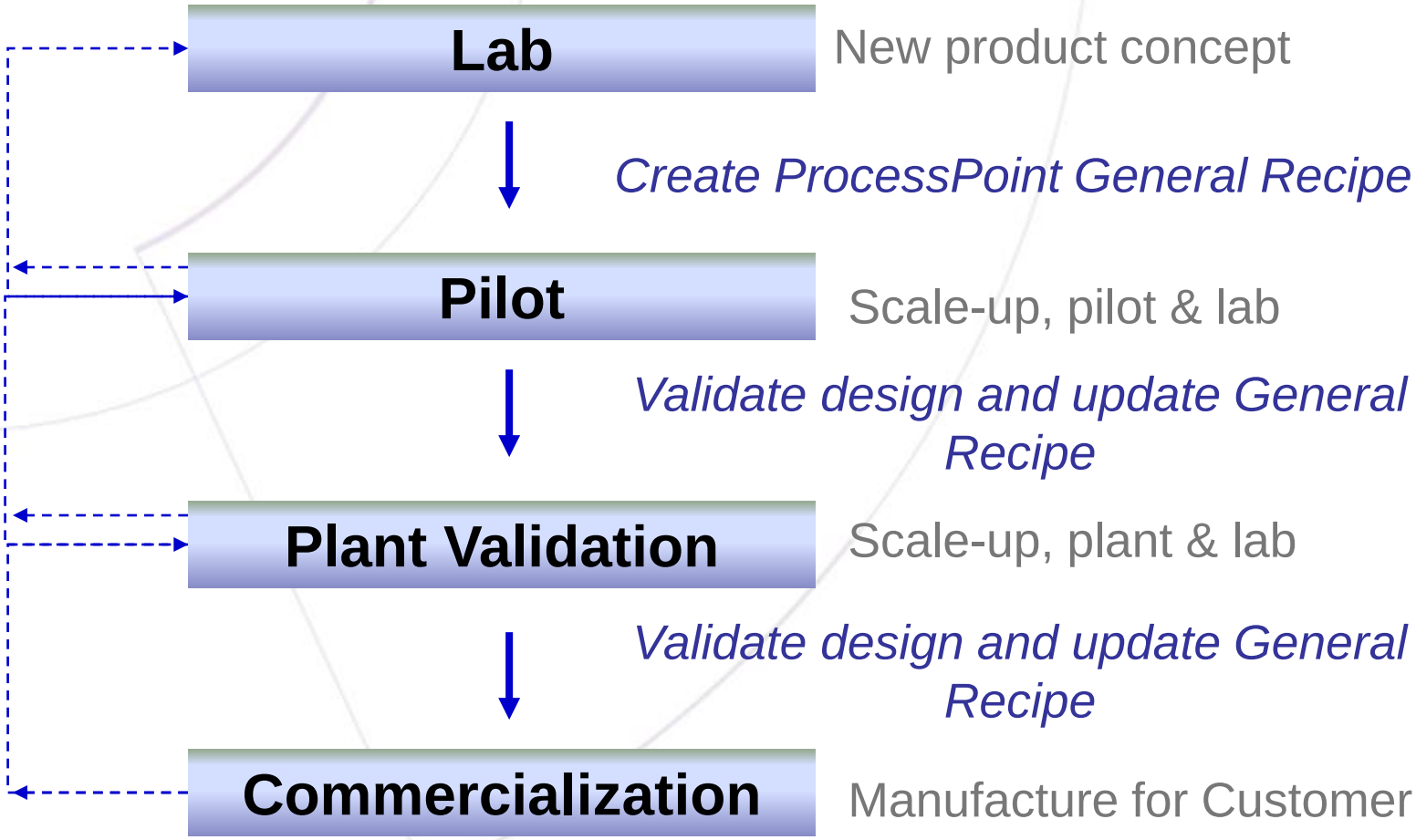
Applications

- Adhesives
- Packaging
- Construction
- Gloves
- Nonwovens and Textiles
- Performance Resins
- Specialty Paper
- Latex Modified Concrete

Drivers for ProcessPoint

- Global R&D, Manufacturing and Sales
- Challenges of bringing systems together from Reichhold and Dow Chemical
- Recipe management in general
  - Management of change for existing products
- Product innovation management
  - Speed to market for new products

Innovation Process



Project Team

- Management Support
  - VP of Technology – creates recipes
  - VP of Manufacturing – uses recipes
- Core
  - Manufacturing
  - Research & Development
  - Environmental, Health & Safety
  - Process Engineering
- Other Team Members
  - Finance, Purchasing, Pilot Plant

Key Requirements

- "One version of the truth" through global database
  - Across departments & geographical locations
- Facilitate company-wide collaboration
- Flexible recipe development & management
  - Key ingredients, activity based descriptions
- Searchable recipe database
  - Legacy data was in Excel, difficult to manage
- Management of change
  - Audit trail, Electronic approvals, Versioning
- Security of intellectual capital

Other Factors in Selection of ProcessPoint

- ISA S88 General Recipe Standard
- Raw material management
- Role based views using Display Templates
  - Internal & Customer
- Flexibility for additional uses of software
  - Marketing, Regulatory, Enterprise accounting
- Positive experience with OSIsoft
  - Using PI software at manufacturing sites

Project Scope

- Raw Materials
  - Properties
- Intermediates & Products
  - Properties
  - Formula
  - Procedures
- Final Products
  - Key properties
  - Packaging data

Project Scope – Raw Materials

- Each vendor raw material specification is authored, approved & versioned by Purchasing/Technology/EHS
- Latest specifications accessed in real time by Receiving Personnel to ensure C of A compliance
- R & D, Manufacturing have real-time access to the most recent approved raw material data and related documents

Project Scope – Intermediates & Bulk Product

- Technology
  - Typical properties
  - Quality specification limits
  - “Dry Parts” activity based formula
  - General recipe composition, procedure, specifications
- E H & S
  - Health, safety and environmental risks
  - Labeling needs
  - Regulatory compliance status
- Manufacturing
  - Product scale-up
  - Master Recipe

Project Scope – Packaged Product

- Package codes
- Key final product properties
- Product display templates used by salespeople and customers

Anticipated Benefits

- Enhanced collaboration
- Improved scale-up practices
  - Fewer errors
  - Reduced time to manufacturing
  - Improved quality
  - Metrics on new product development process
- Improved management of change
  - Single authoritative source of data
  - Networked application
  - User defined displays of data
- Searchable Data Base

Summary – Benefits Realized

Single, authoritative source of product information for other business systems

- Master Recipes – composition, **DCS procedure and parameters**, **LIMS specifications**
- Raw Materials – approved materials and receiving specifications
- Enterprise accounting – material masters, scheduling, costing
- **Regulatory – national chemical inventories and FDA status**
- Marketing – active products, package types and sales specifications

Product innovation management

- Recipes reflect both “wet” and “dry” composition
- **Organizational collaboration**
- Accuracy of development plans and results
- Searchable data base
- Record of changes

Intellectual property

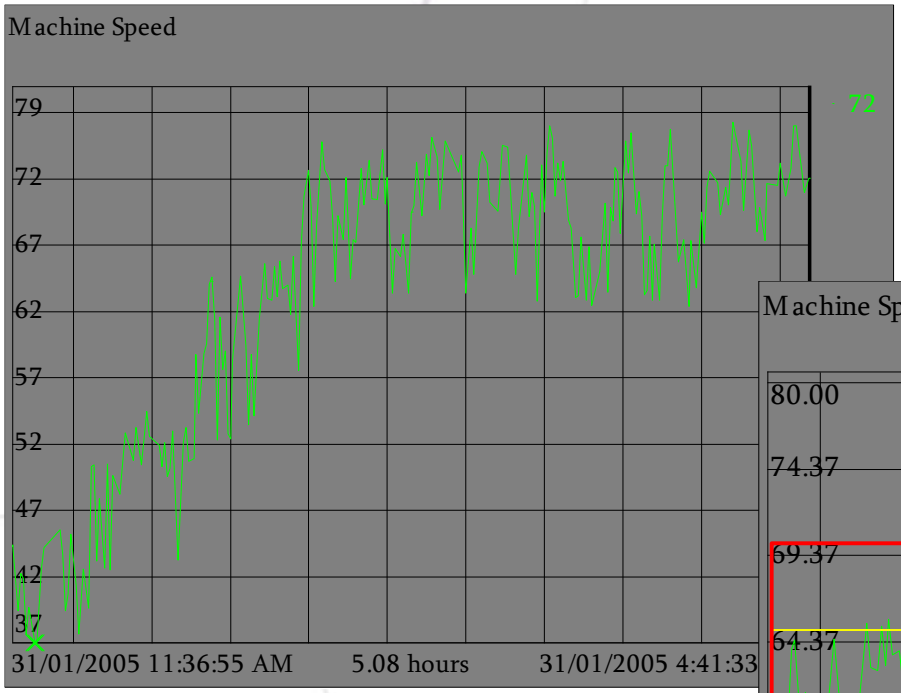
- **Faster, more insightful management of change**
- Record of changes – both events and details
- Limited access to view or change as appropriate

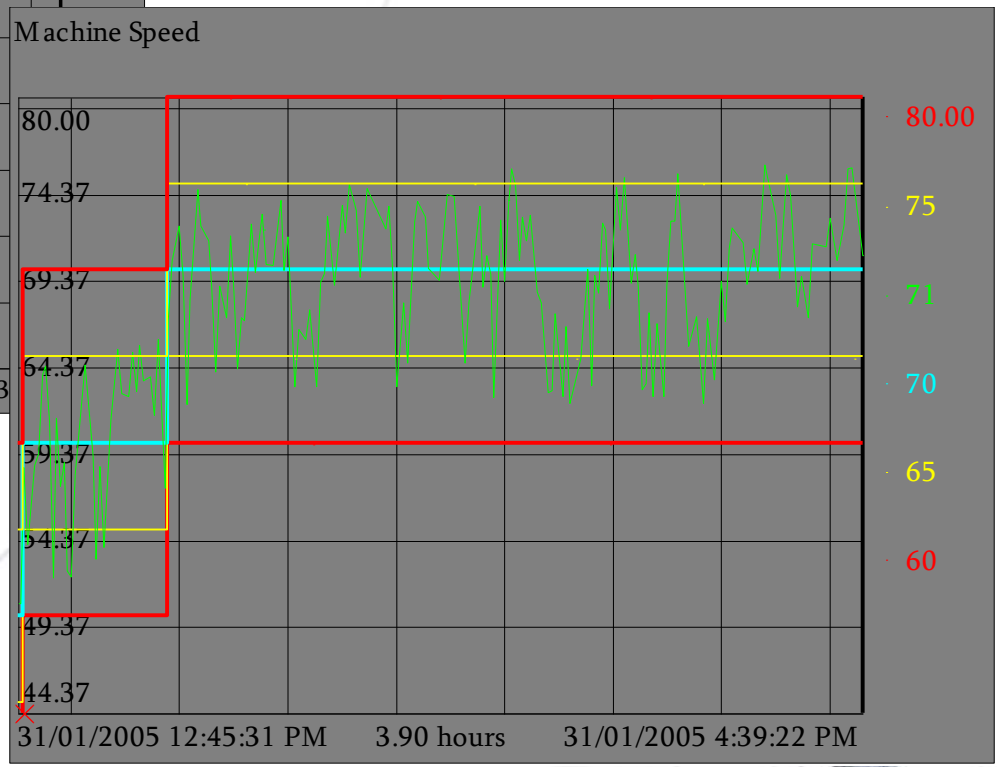
RtPM Integration

ProcessPoint Fit with RtPM

- The PI System stores the complete history of ***what has happened*** in the process
- ProcessPoint stores the specifications that define how the process ***should*** run
- Like the PI System does for real-time data, ProcessPoint stores the history of spec data forever and allows it to be used in meaningful ways
- Integration scenarios involve comparison of actual vs. planned

Why Integrate: The Power of Contextual Data

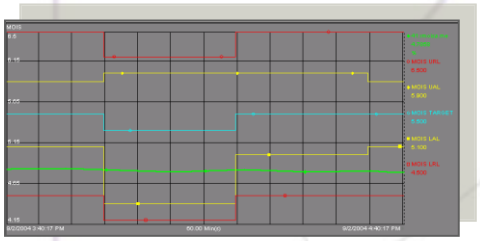




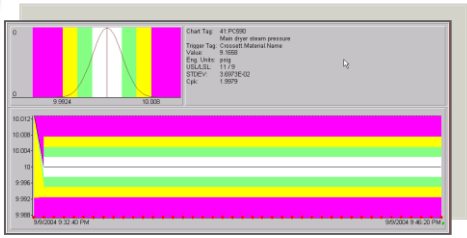
Limits add additional value to the PI actual data. Many PI tags have some measure of correctness.

Single source of spec data for the RtPM Platform

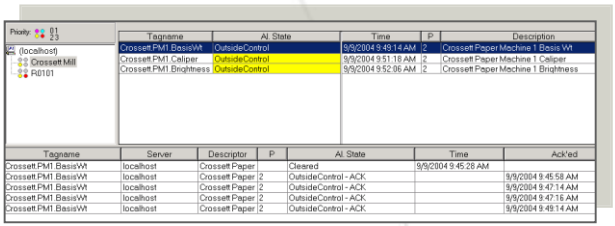
ProcessPoint Product Specifications



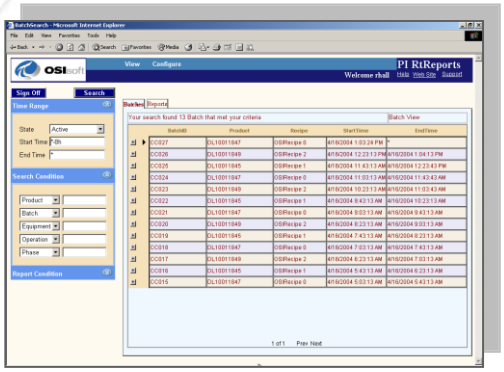
ProcessBook Screens & Trends



SQC Add-In to ProcessBook



SQC Alarms

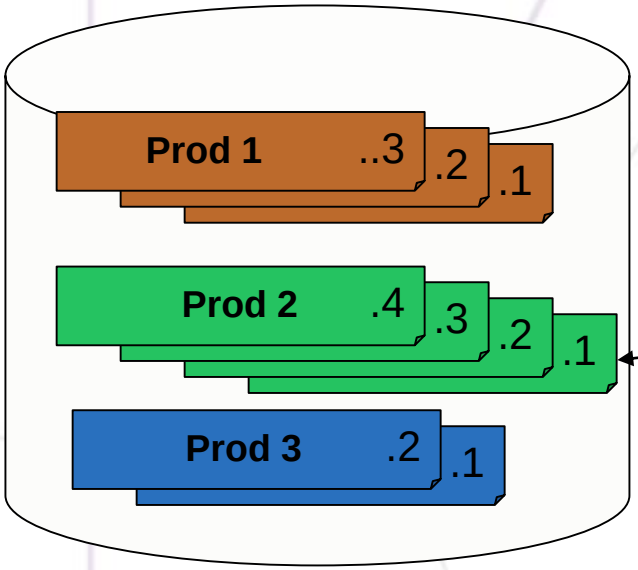


RtReports

Integration of Specs & Actual Results

How do ProcessPoint Tag Specs work with PI Clients?

COM Connector



ProcessPoint Database

Spec/Target Data

C
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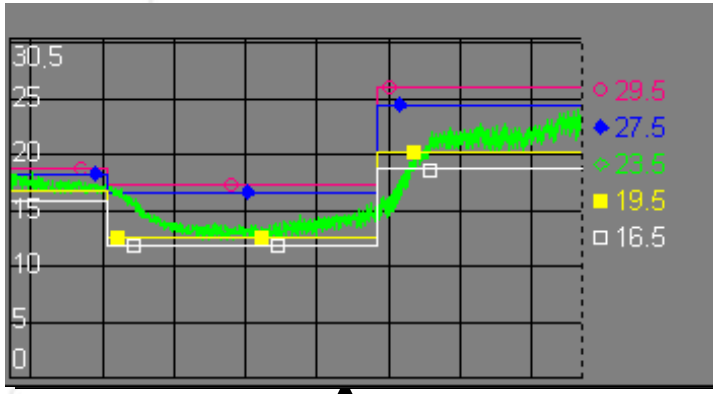
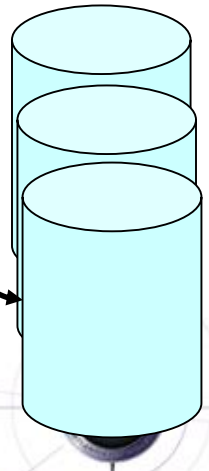


PI Server

Process Actuals



One PI tag per parameter, the correct spec values are pulled from ProcessPoint as the reference grade changes in time

For all OSIsoft RtPM Clients

ProcessBook

AlarmView

Batch

SQC

DataLink

Data Entry Grid

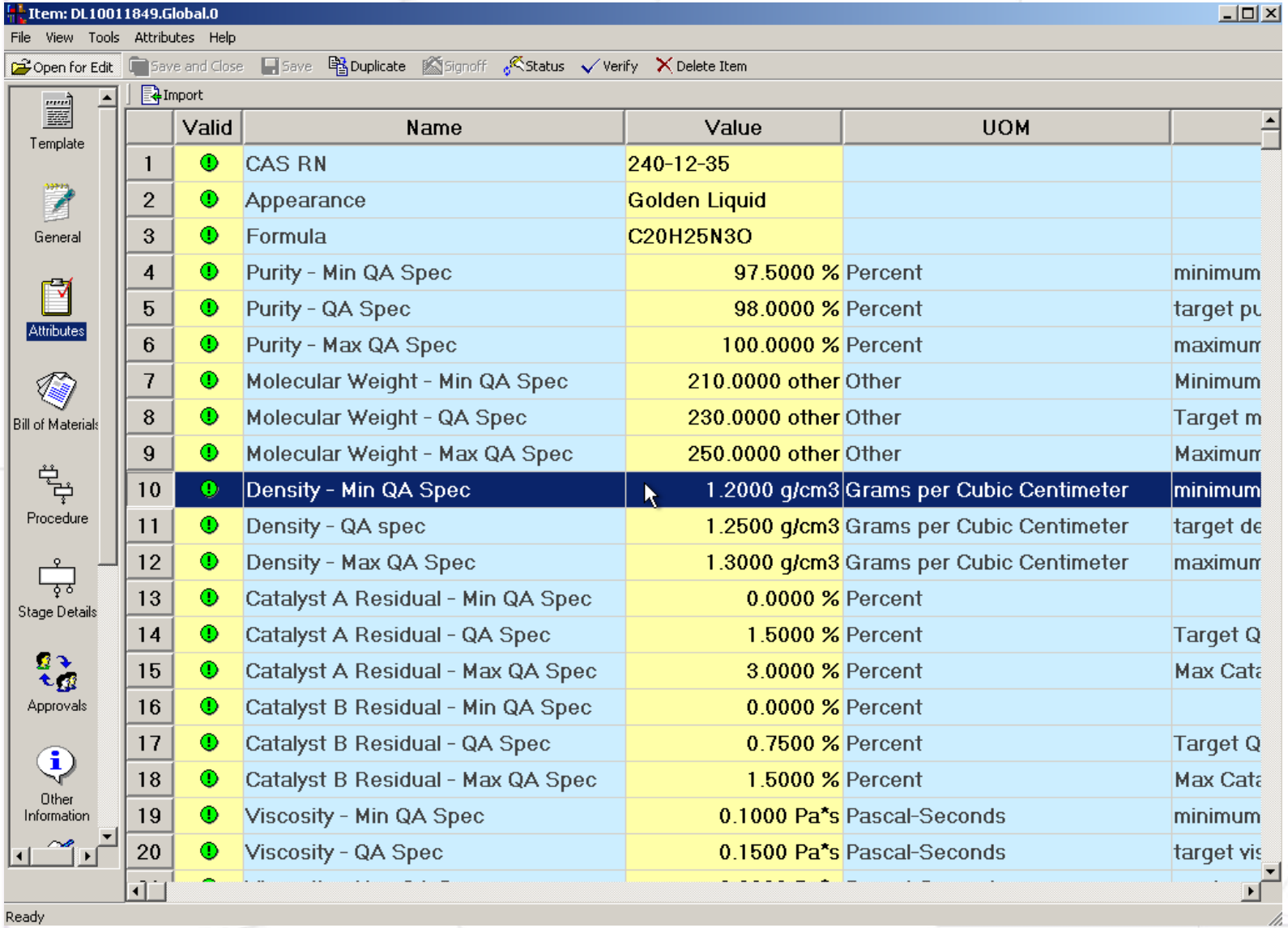
RtWebParts

RtReports

For all OSIsoft RtPM Clients

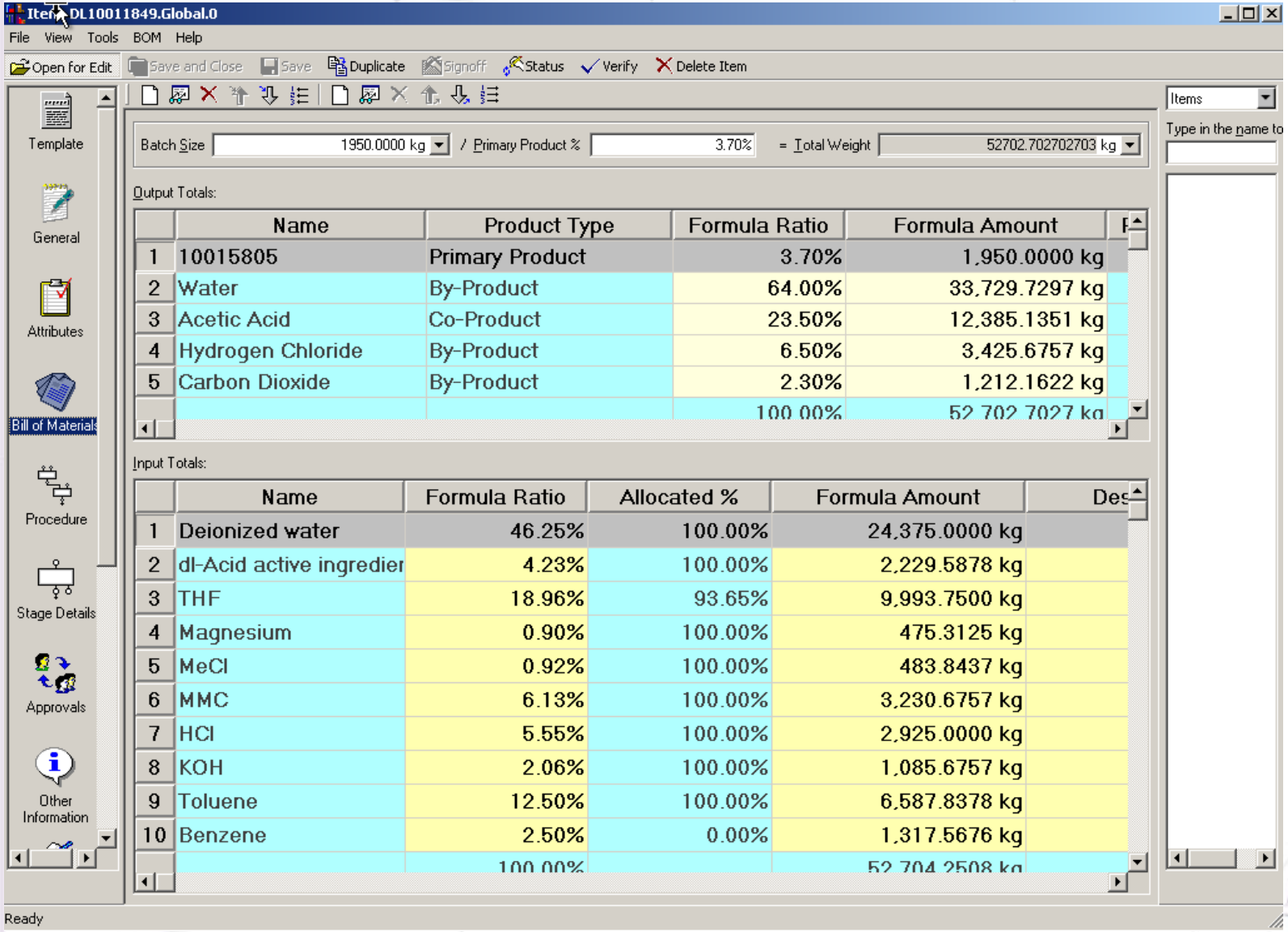
ProcessPoint provides ability to define, document and manage specifications, limits & targets *(the Tag Specs)* associated with quality, process and KPIs.

Within ProcessPoint: Set Attributes and Targets

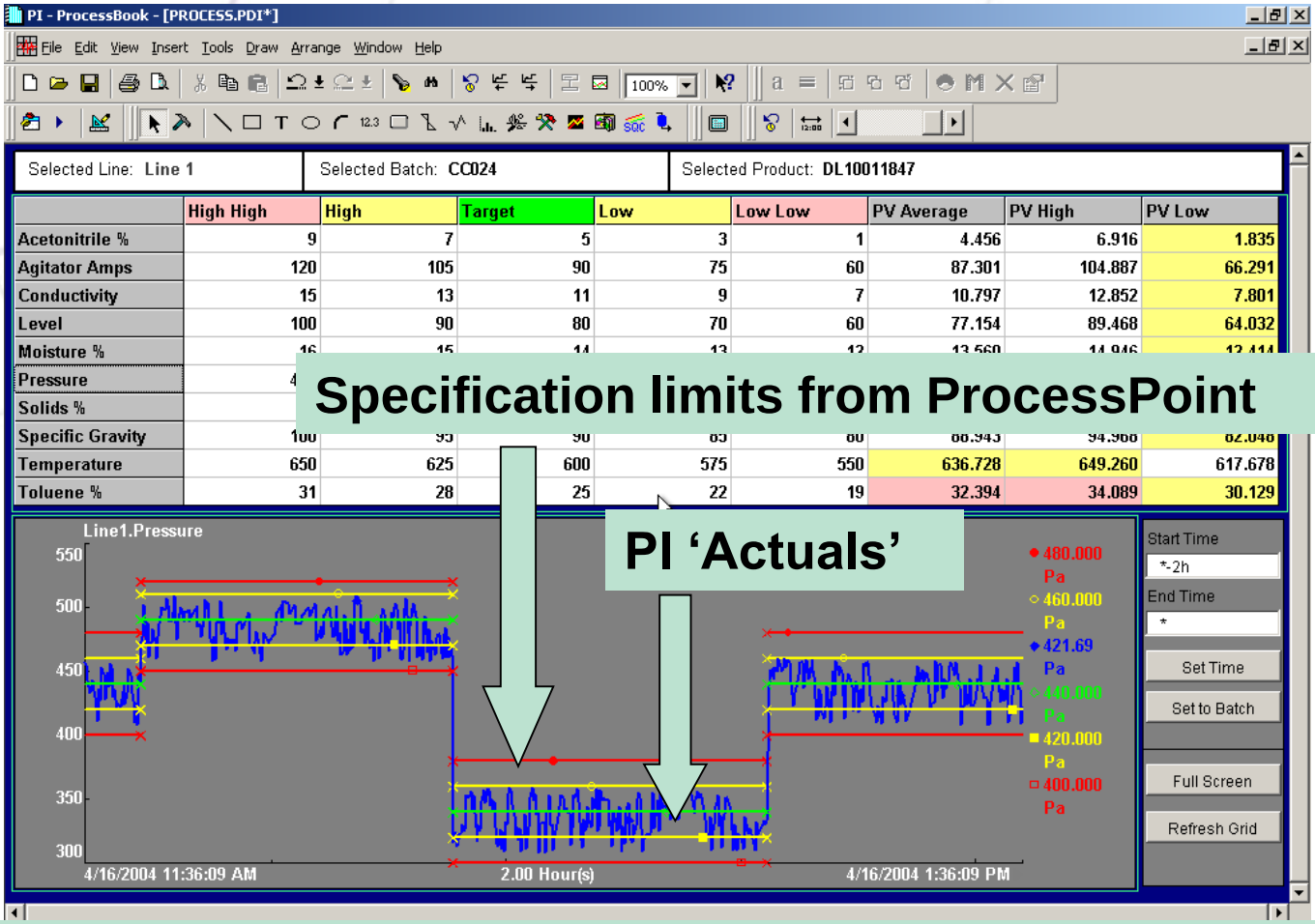


	Valid	Name	Value	UOM	
1		CAS RN	240-12-35		
2		Appearance	Golden Liquid		
3		Formula	C20H25N3O		
4		Purity - Min QA Spec	97.5000 %	Percent	minimum
5		Purity - QA Spec	98.0000 %	Percent	target pu
6		Purity - Max QA Spec	100.0000 %	Percent	maximum
7		Molecular Weight - Min QA Spec	210.0000 other	Other	Minimum
8		Molecular Weight - QA Spec	230.0000 other	Other	Target m
9		Molecular Weight - Max QA Spec	250.0000 other	Other	Maximum
10		Density - Min QA Spec	1.2000 g/cm3	Grams per Cubic Centimeter	minimum
11		Density - QA spec	1.2500 g/cm3	Grams per Cubic Centimeter	target de
12		Density - Max QA Spec	1.3000 g/cm3	Grams per Cubic Centimeter	maximum
13		Catalyst A Residual - Min QA Spec	0.0000 %	Percent	
14		Catalyst A Residual - QA Spec	1.5000 %	Percent	Target Q
15		Catalyst A Residual - Max QA Spec	3.0000 %	Percent	Max Cata
16		Catalyst B Residual - Min QA Spec	0.0000 %	Percent	
17		Catalyst B Residual - QA Spec	0.7500 %	Percent	Target Q
18		Catalyst B Residual - Max QA Spec	1.5000 %	Percent	Max Cata
19		Viscosity - Min QA Spec	0.1000 Pa*s	Pascal-Seconds	minimum
20		Viscosity - QA Spec	0.1500 Pa*s	Pascal-Seconds	target vis

Within ProcessPoint: Specified Raw Materials



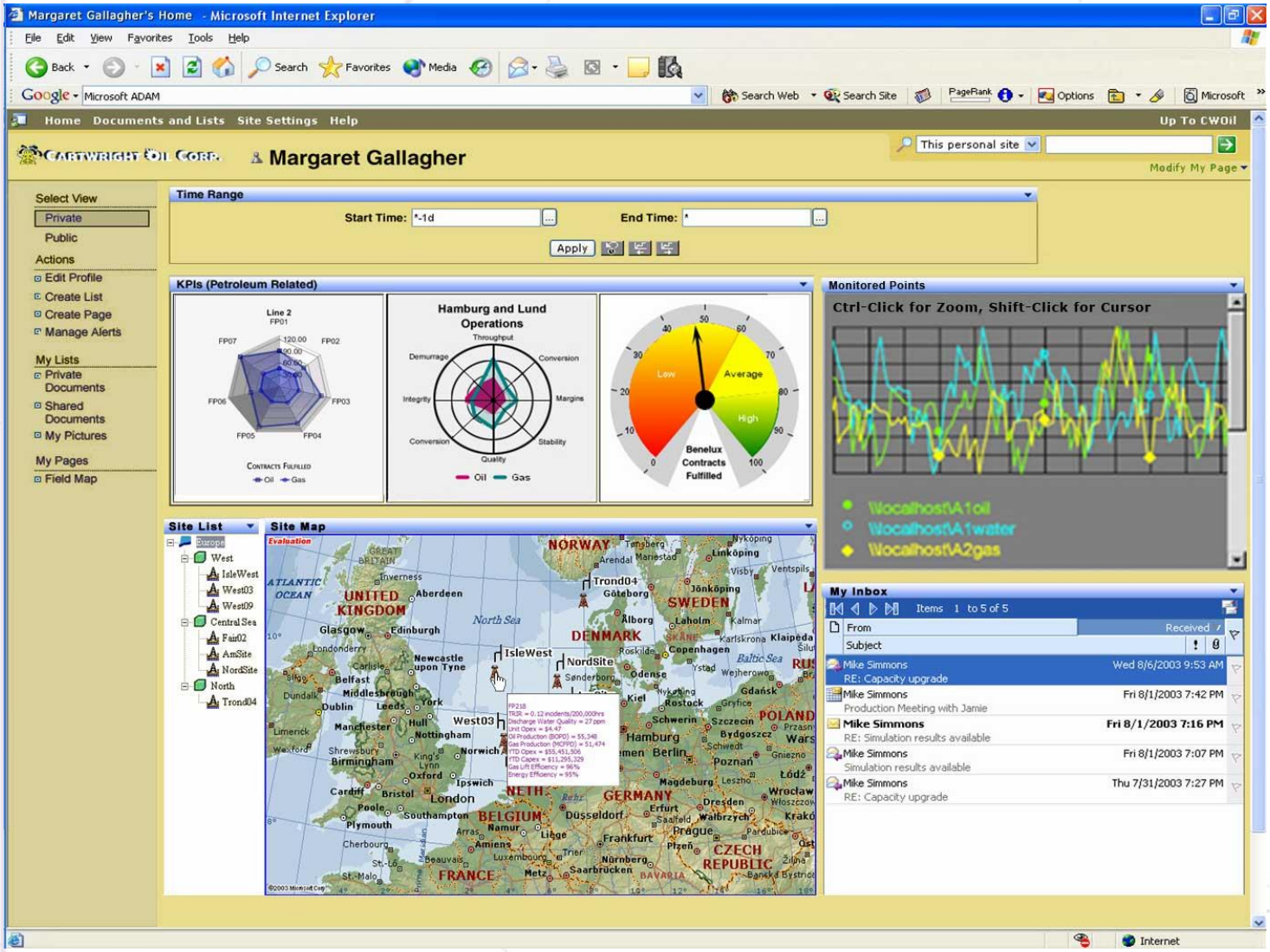
Integration with ProcessBook



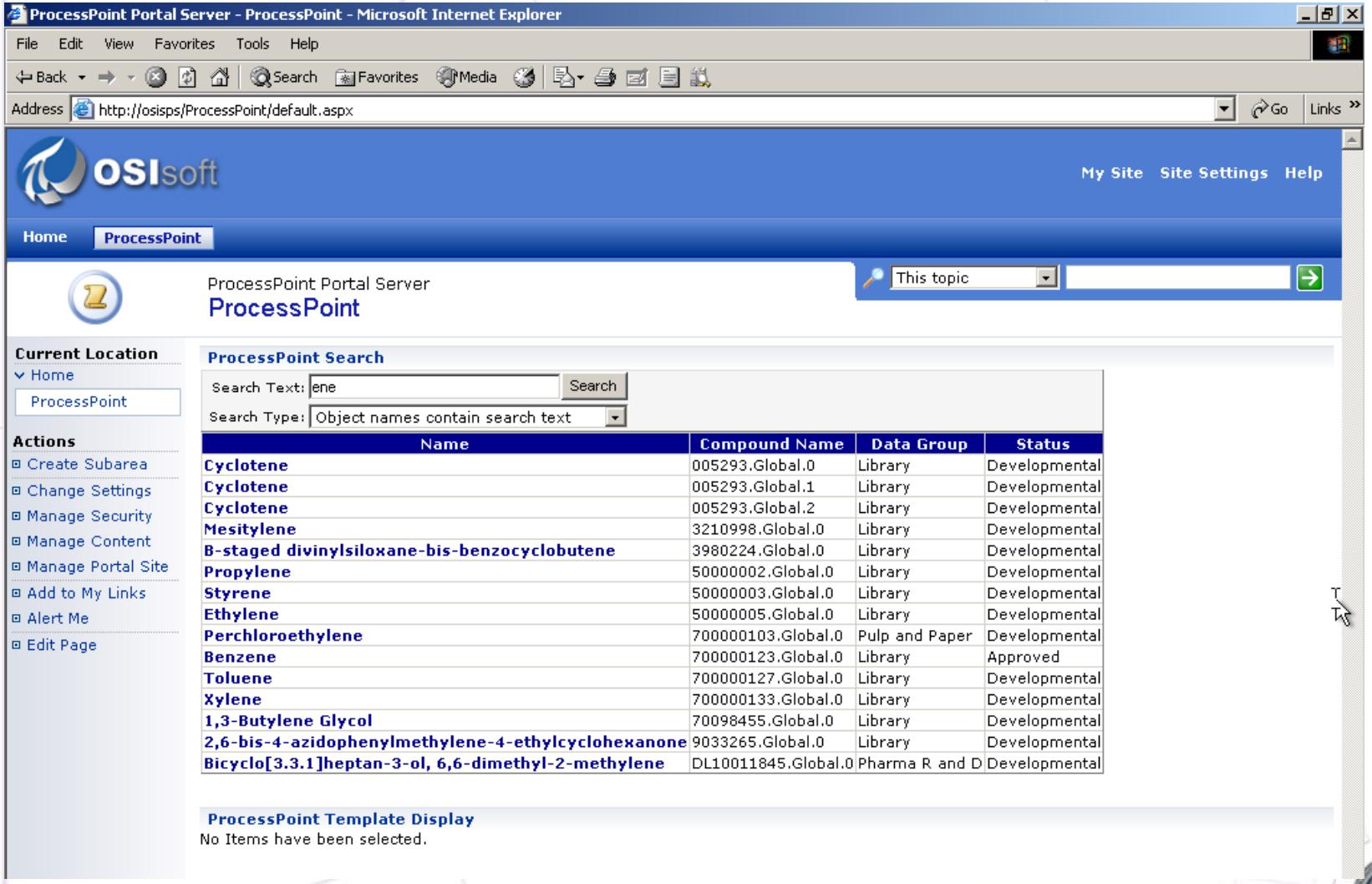
	High High	High	Target	Low	Low Low	PV Average	PV High	PV Low
Acetonitrile %	9	7	5	3	1	4.456	6.916	1.835
Agitator Amps	120	105	90	75	60	87.301	104.887	66.291
Conductivity	15	13	11	9	7	10.797	12.852	7.801
Level	100	90	80	70	60	77.154	89.468	64.032
Moisture %	16	15	14	13	12	13.560	14.946	12.414
Pressure	4							
Solids %								
Specific Gravity	100	95	90	85	80	88.943	94.966	82.048
Temperature	650	625	600	575	550	636.728	649.260	617.678
Toluene %	31	28	25	22	19	32.394	34.089	30.129

As the product code on a line changes, the correct limits are automatically pulled from the ProcessPoint database.

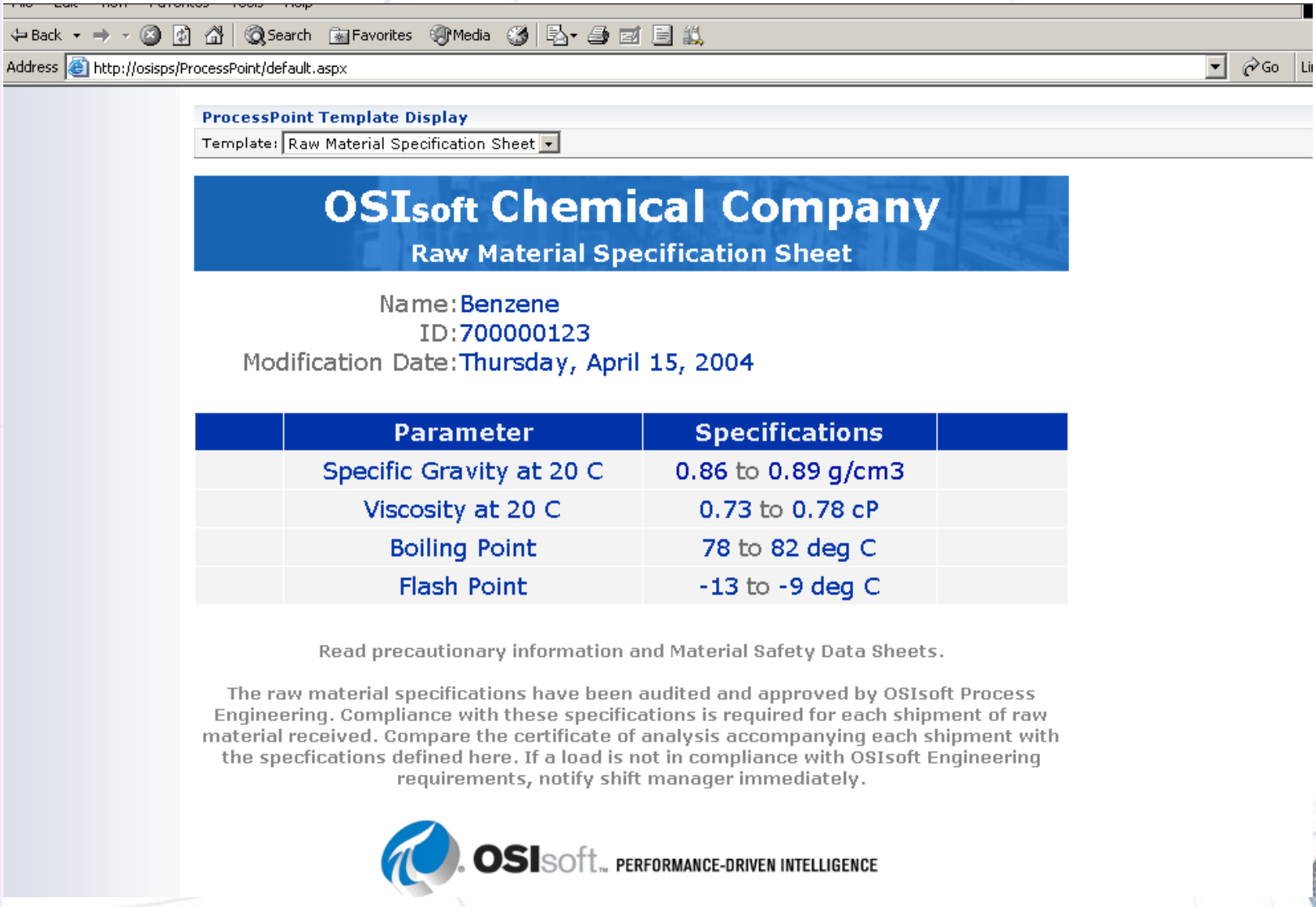
Integration with RtPortal



ProcessPoint Web Parts



ProcessPoint Web Parts

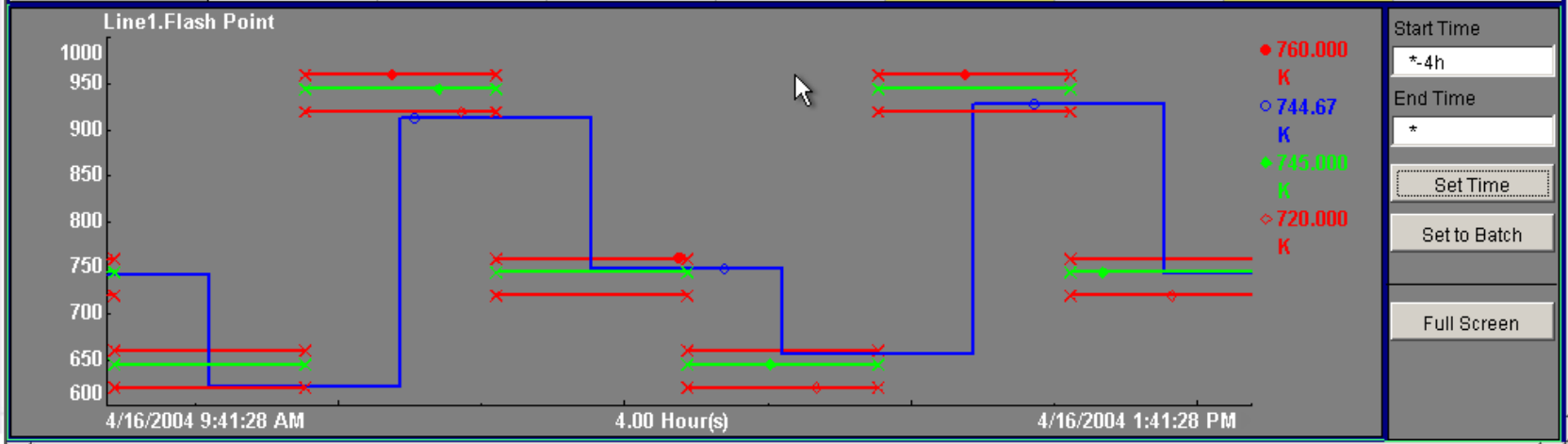


ProcessBook: Datasheet Control

PI - ProcessBook - [QUALITY.PDI*]

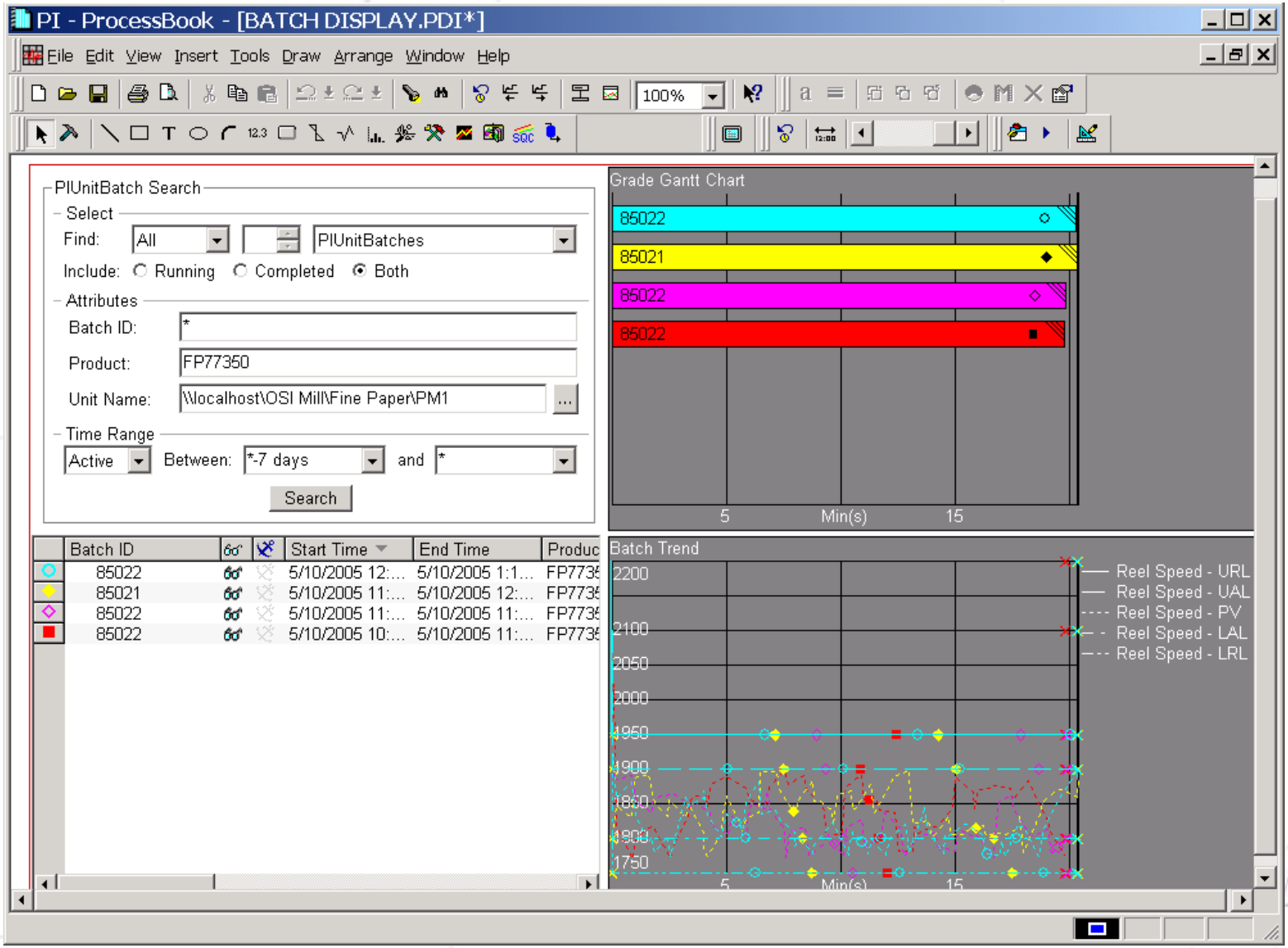
File Edit View Insert Tools Draw Arrange Window Help

	CC020 DL10011849 4/16 08:23 Complete	CC021 DL10011847 4/16 09:03 Complete	CC022 DL10011845 4/16 09:43 Complete	CC023 DL10011849 4/16 10:23 Complete	CC024 DL10011847 4/16 11:03 Complete	CC025 DL10011845 4/16 11:43 Complete	CC026 DL10011849 4/16 12:23 Complete	CC027 DL10011847 4/16 13:03 Running
Catalyst A Residual	0.5901212	2.1	4	0.3939543	1.832597	3.91243	0.9203528	
Catalyst B Residual	0.3633016	3.252878	4.328062	4.559462E-03	2.172655	4.11168	-0.1916211	
Density	1252.794	830.231	1000.974	1251.748	885.8098	1042.822	1173.248	
Flash Point	937.753	742.3509	621.6275	912.3829	749.0353	657.2111	927.36	
Melting Point	854	591.1044	502.9516	741.6687	820	454.1862	813.6805	
Molecular Weight	212.6928	173.0822	166.494	239.5381	192.173	145.7685	201.3129	
pH	4.86317	6.765071	8.3136	4.29985	7.056501		5.073818	
Purity	98.0093	96.56736	92.53886	99.49329	94.79225	91.28591	97.50587	
Refractive Index	1.93404	1.729874	1.627967	1.691012	1.904444	1.316218	1.639311	
Viscosity		0.5987991	1.112121	0.2207764	0.3570394	1.378718	7.399274E-02	

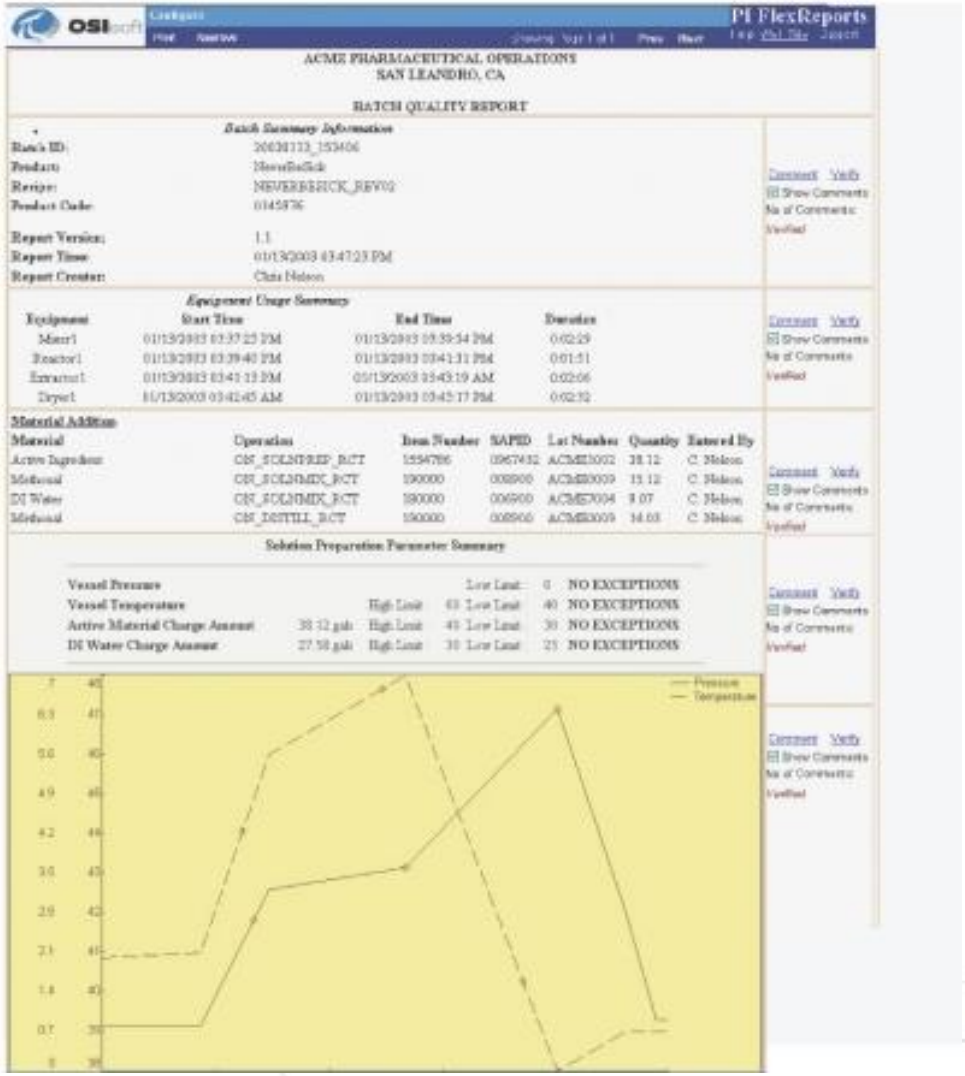


Ready

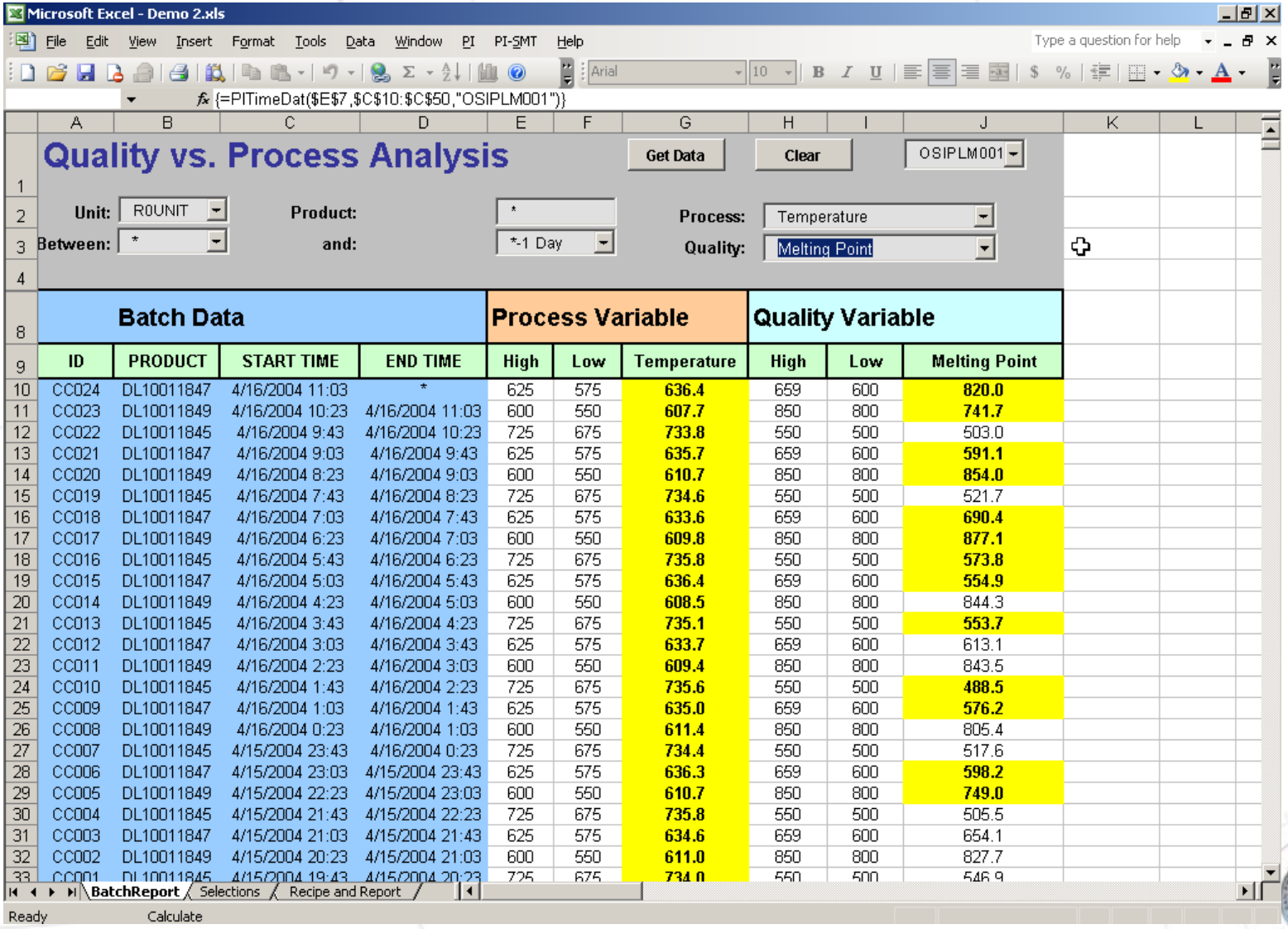
PI BatchView: Batch Comparisons



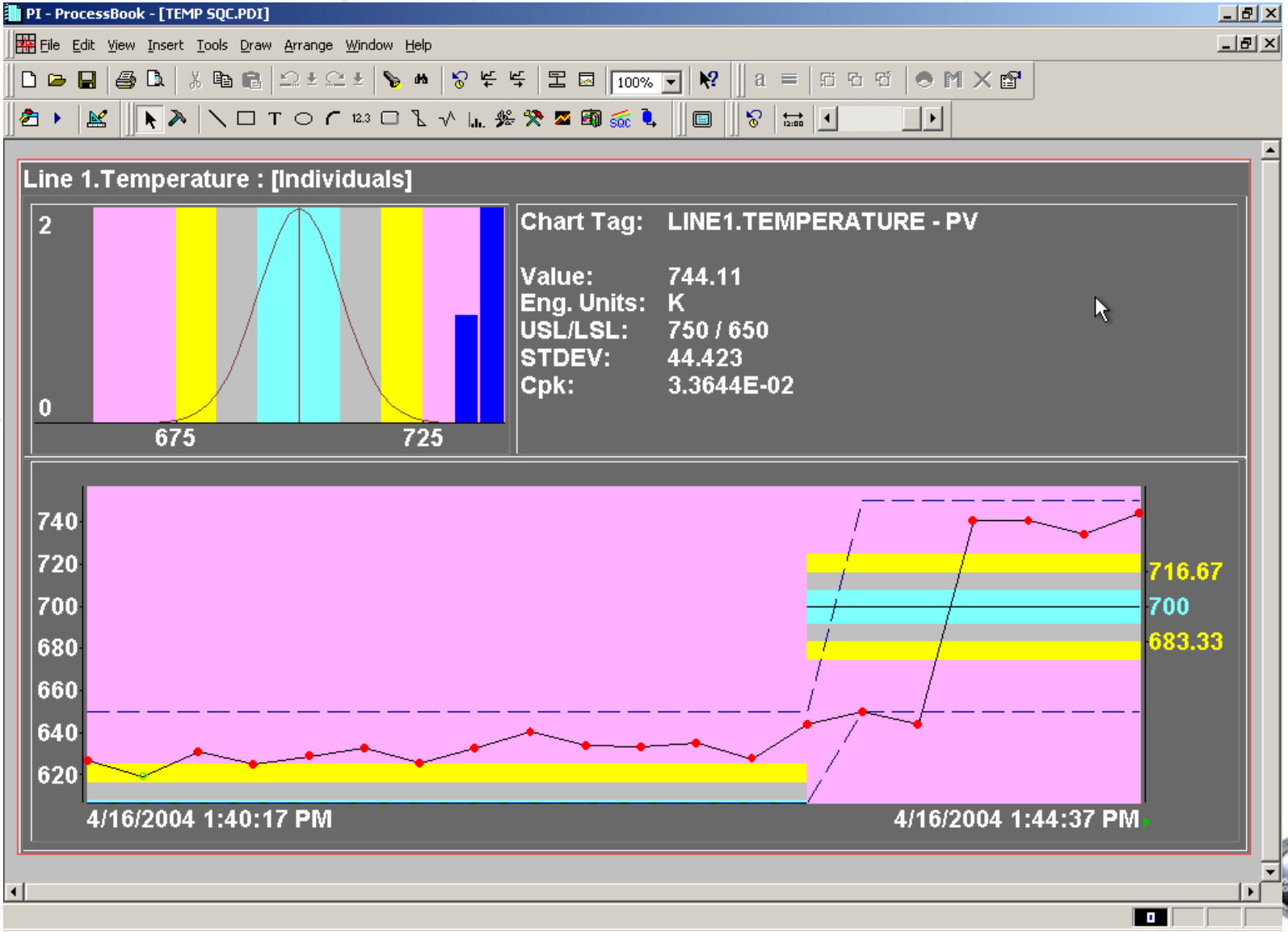
RtReports: Rule-based Exception Reporting



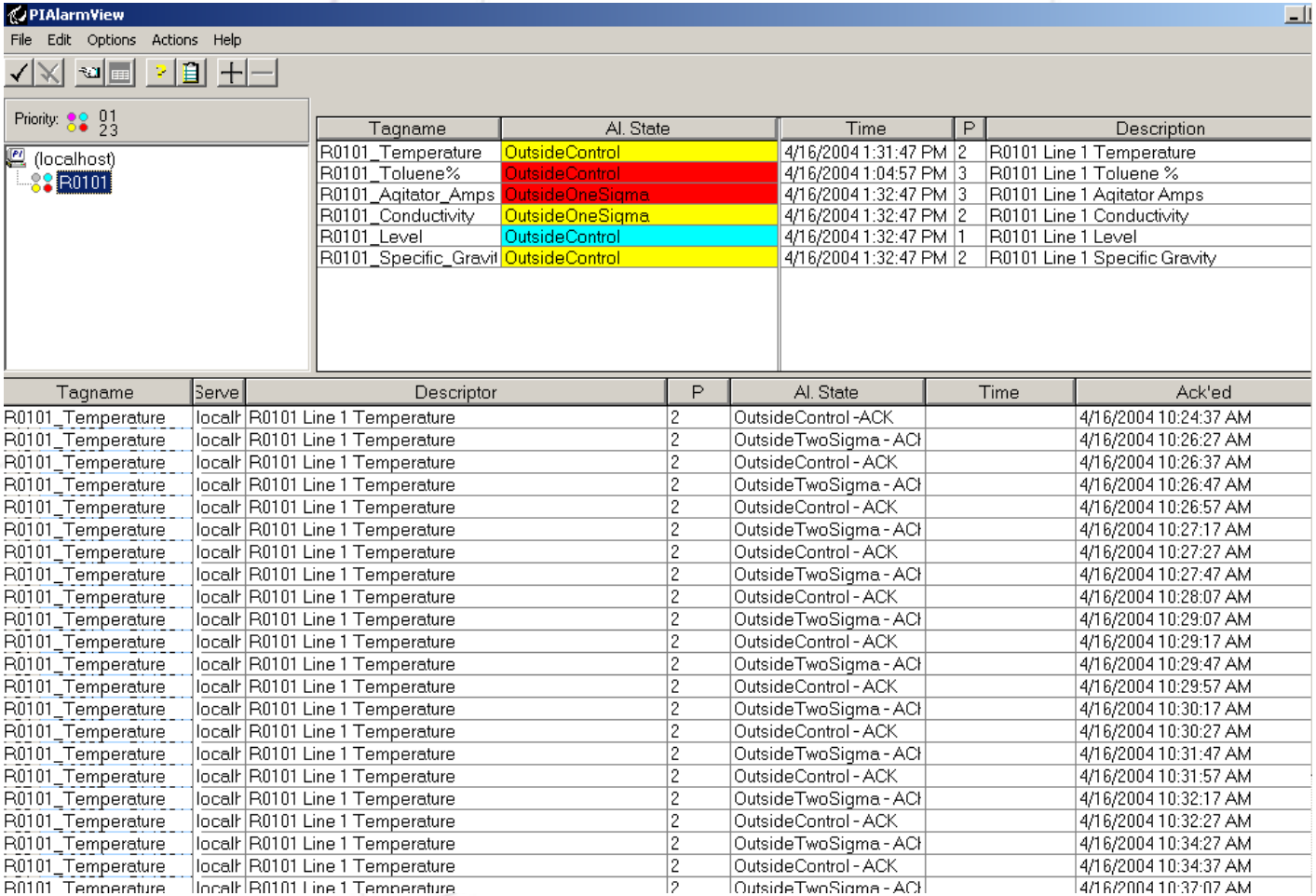
PI Datalink: Process Analysis



PI SQC: Alarms and SQC Analysis



AlarmView: Alarm Management



Tagname	Al. State	Time	P	Description
R0101_Temperature	OutsideControl	4/16/2004 1:31:47 PM	2	R0101 Line 1 Temperature
R0101_Toluene%	OutsideControl	4/16/2004 1:04:57 PM	3	R0101 Line 1 Toluene %
R0101_Agitator_Amps	OutsideOneSigma	4/16/2004 1:32:47 PM	3	R0101 Line 1 Agitator Amps
R0101_Conductivity	OutsideOneSigma	4/16/2004 1:32:47 PM	2	R0101 Line 1 Conductivity
R0101_Level	OutsideControl	4/16/2004 1:32:47 PM	1	R0101 Line 1 Level
R0101_Specific_Gravit	OutsideControl	4/16/2004 1:32:47 PM	2	R0101 Line 1 Specific Gravity

Tagname	Serve	Descriptor	P	Al. State	Time	Ack'ed
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl -ACK		4/16/2004 10:24:37 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:26:27 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:26:37 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:26:47 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:26:57 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:27:17 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:27:27 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:27:47 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:28:07 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:29:07 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:29:17 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:29:47 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:29:57 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:30:17 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:30:27 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:31:47 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:31:57 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:32:17 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:32:27 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:34:27 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideControl - ACK		4/16/2004 10:34:37 AM
R0101_Temperature	localh	R0101 Line 1 Temperature	2	OutsideTwoSigma - ACI		4/16/2004 10:37:07 AM

The Alarm limits are automatically updated by the ProcessPoint COM Connector.

Summary

- ProcessPoint provides Product Data Management
  - Process Specifications
  - Product Specifications
- Dow Reichhold Business Example
  - Company wide initiative
  - Managed material and product information
  - Managed from R&D through to manufacturing
- RtPM Integration
  - Supplies the intended process values
  - Tag targets and limits across many PI clients