Implementing an RtPM-based Product Tank Transfer Using Analysis Framework

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Bayer MaterialScience

PUREmotion

Global Manufacturing Systems (GMS)

Reliability Systems Development & Support

Bayer MaterialScience

PURemotion

Which OSIsoft Products Do We Use?

Bayer Material Science has globally rolled out PI-RtPM as our standard platform for process related information

- PI Enterprise Server with Advanced Server Application
- ProcessBook and DataLink Clients
- Various Interfaces

In addition, on a site by site basis the following products are being used

ACE - Advance Computing Engine, AF – Analysis Framework

Batch products and BatchView

PI Server Framework Add in and PI Professional Server

RLINK, RtWebParts, Sigmafine and SQC

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How we use PI and RtPM ?

Typical Applications Prior to Using Analysis Framework - AF

- To calculate OEE – Overall Equipment Efficiency OEE= A x R x Q
- To provide Process Modeling for Manufacturing/Technology Departments.
- Solve Complex Calculations – Fouling for Heat Exchangers
- Present Information about Production to Upper Management

First Project Application for Analysis Framework – AF

- Tank Transfers Project

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Business Drivers for a Tank Farm Transfer Project

- Reduce Product Contamination
- Environmental Concerns
- Personnel Safety
- Decision Support Management
- Tracking Product Flow and Location
- Provide Web Based Visibility of Inventory
- Reduced Use of Paper
- Increased Product Throughput
- Increase Equipment Utilization
- Reduce Nuisance Alarms
- Excel Based Inventory Reporting

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OEE Conti-Process

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Baytown

Asset Tree	Date Selected	Refresh Page
Show	4/22/2006 Today	Refresh Page

Show Daily Summary

Hide Monitor Screen - Saturday, April 22, 2006

PI TimeStamp	Copy LossCode	Delete LossCode	Availability Actual (BDP: 100.00)	Availability LossCode	Rate Actual (BDP: 48,488.00)	Rate LossCode	Quality Actual (BDP: 100.00)	Quality LossCode
1:00 PM			Waiting For Value From Pi ...		Waiting For Value From Pi ...		Waiting For Value From Pi ...	
12:00 PM			Waiting For Value From Pi ...		Waiting For Value From Pi ...		Waiting For Value From Pi ...	
11:00 AM			100.00		21,532.66	Assign LC	100.00	
10:00 AM			100.00		21,520.66	Assign LC	100.00	
9:00 AM			100.00				100.00	
8:00 AM			100.00				100.00	
7:00 AM			100.00		21,523.31	Raw Material / Utilities	100.00	
6:00 AM			100.00		21,532.11	Raw Material / Utilities	100.00	
5:00 AM			100.00		21,532.46	Raw Material / Utilities	100.00	
4:00 AM			100.00		21,525.93	Raw Material / Utilities	100.00	
3:00 AM			100.00		21,516.94	Raw Material / Utilities	100.00	
2:00 AM			100.00		21,516.04	Raw Material / Utilities	100.00	
1:00 AM			100.00		21,523.90	Raw Material / Utilities	100.00	

Raw Material / Utilities
---Raw Material 100 %
------Chlorine
B Shift, Baytown 4/22/2006 11:00:05 AM

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OEE Conti-Process

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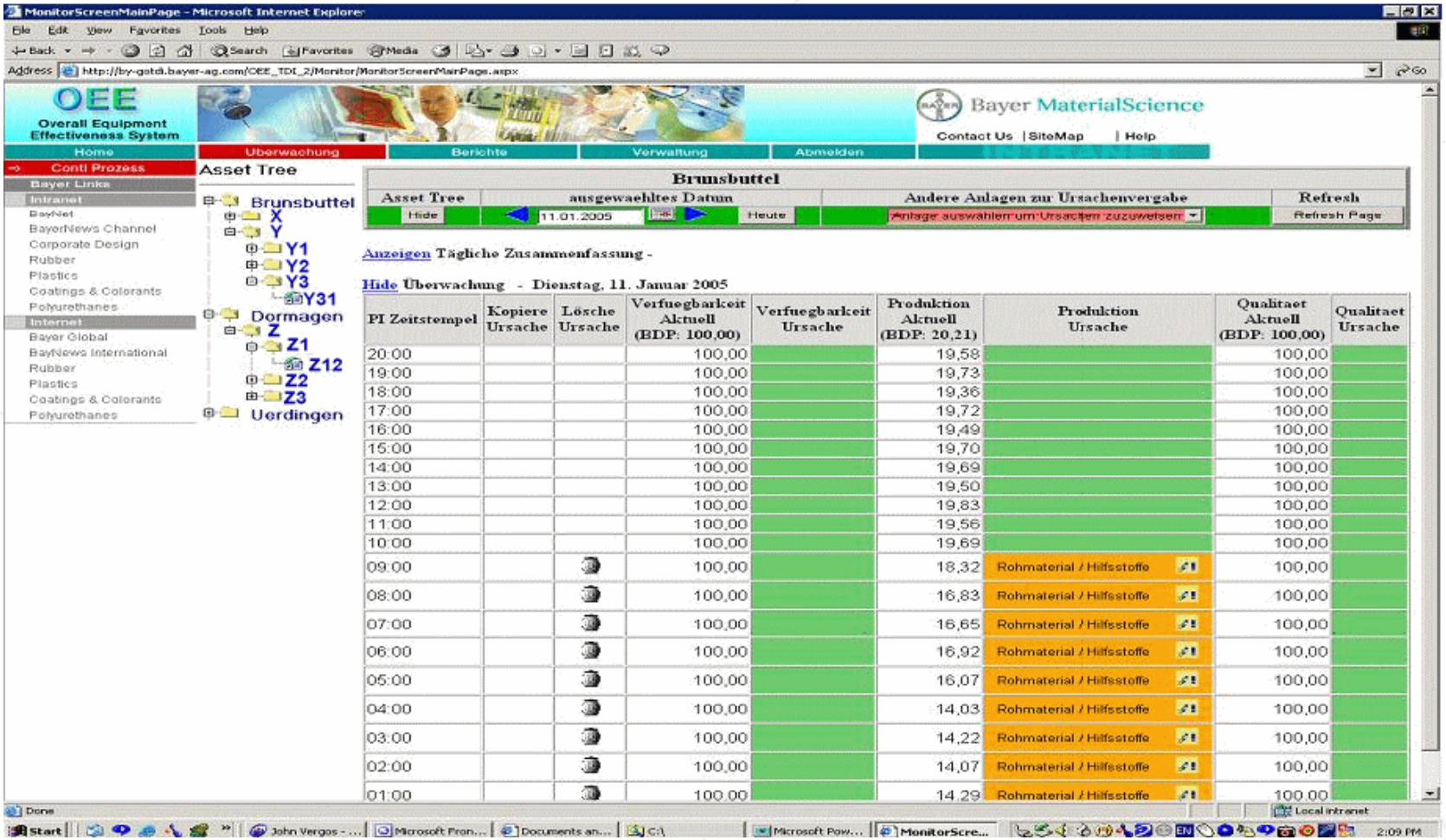

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OEE Batch-Process

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OEE - KPI Reporting

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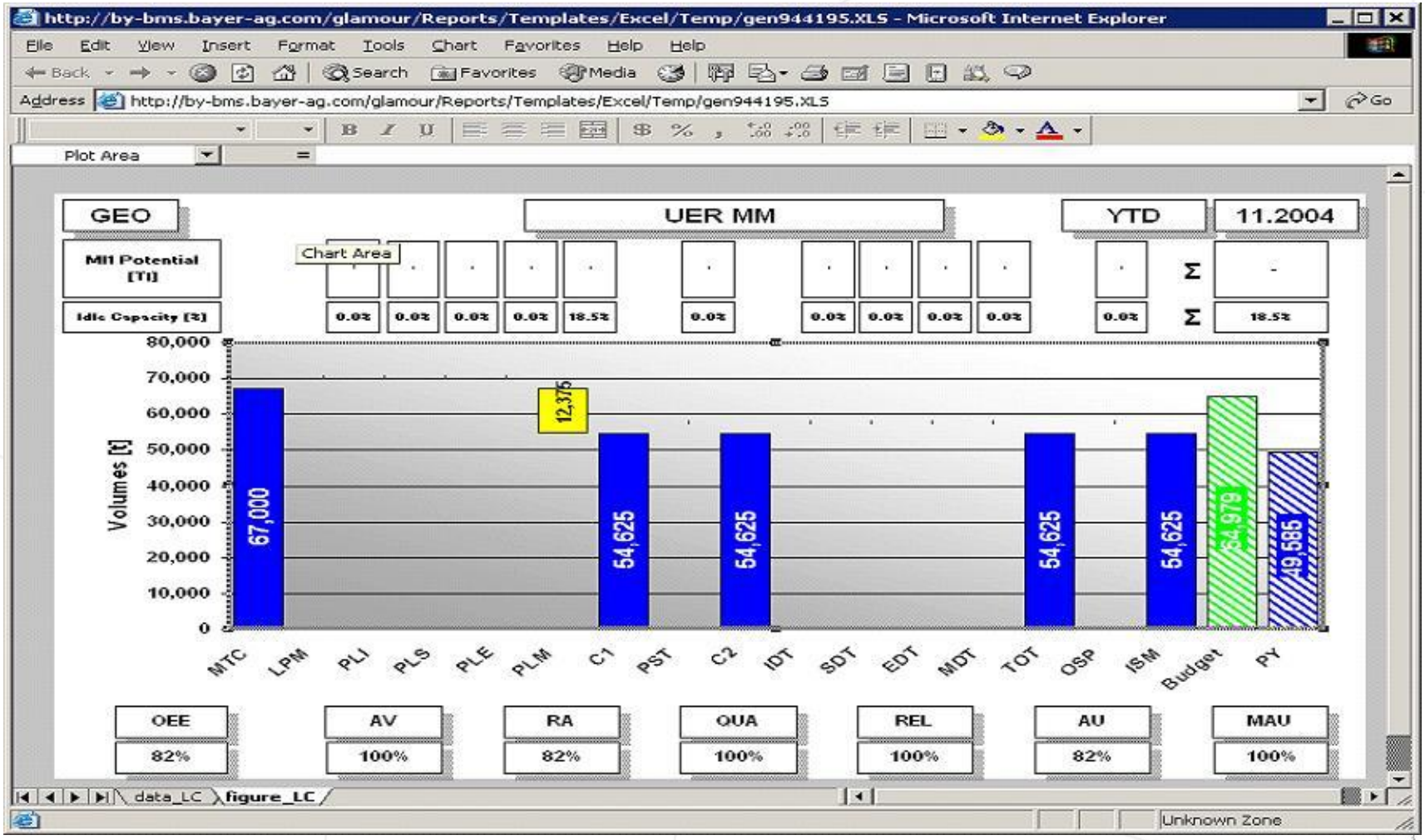

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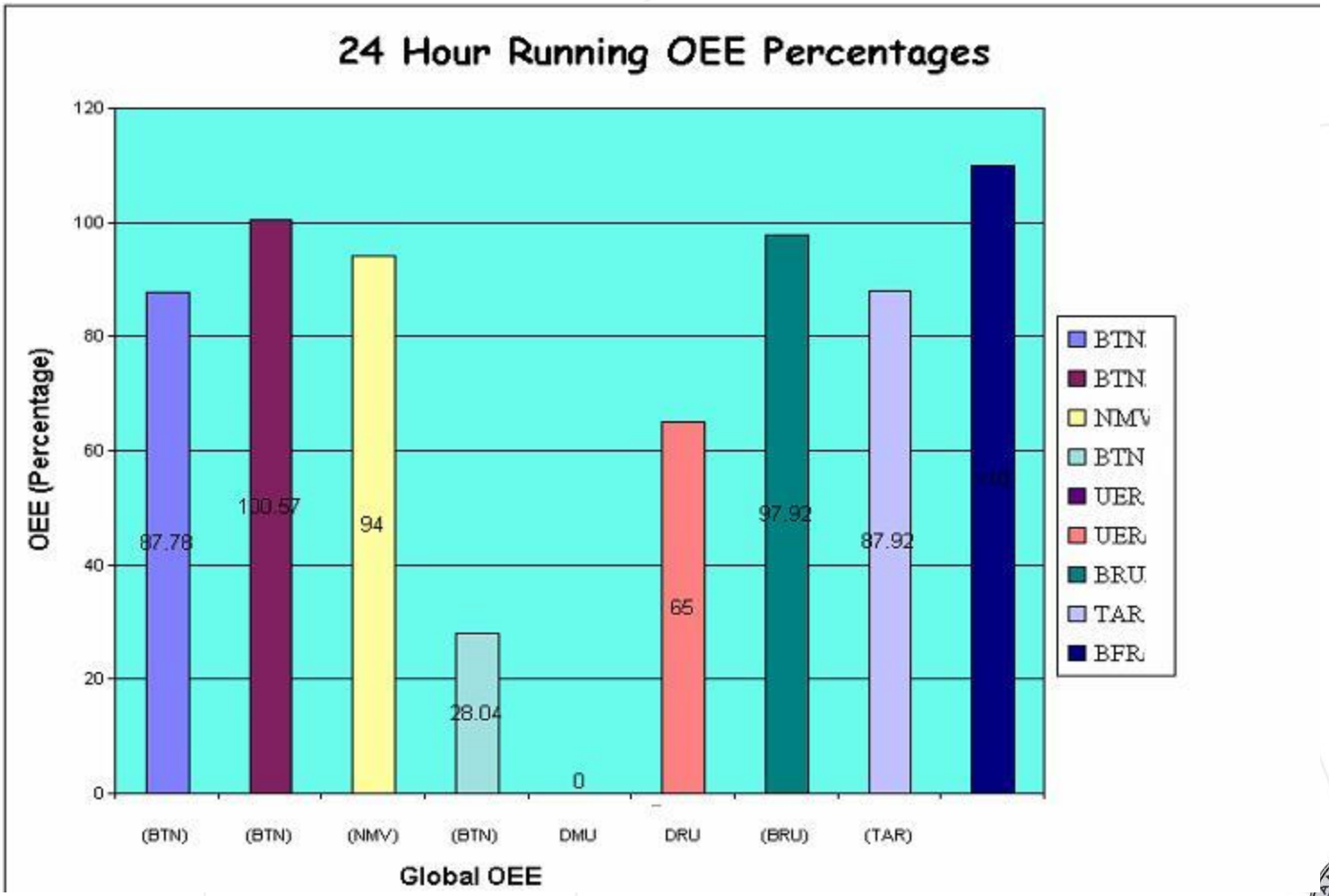
OEE - Reporting



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PROCESS COST MODELS

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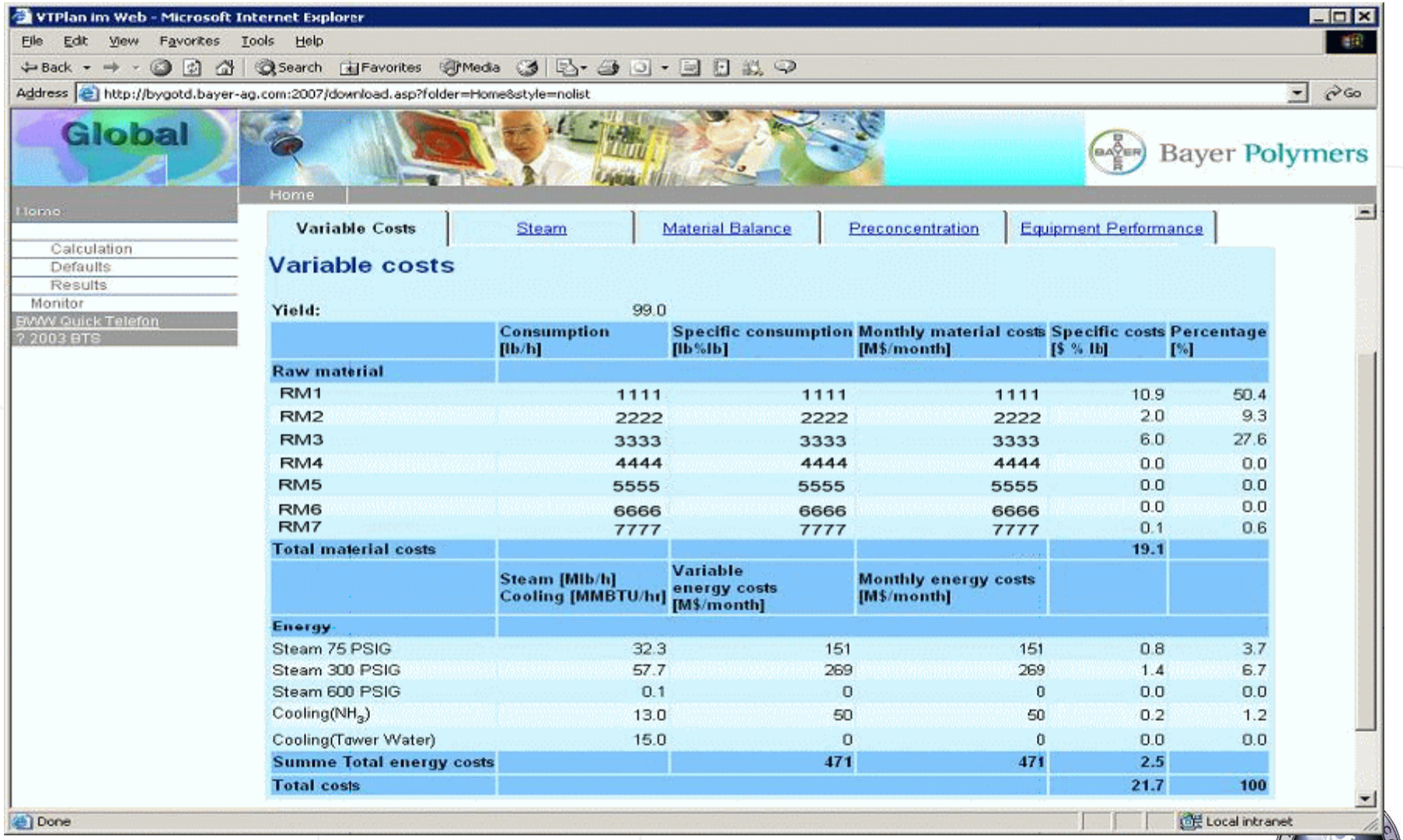

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Complex Calculations

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Fouling Calculation

Dormagen Site | UNIT1 | CA32WA01-CSC Splitter

Dormagen Site--> UNIT1->CA32WA01-CSC Splitter-->

Start: 4/21/2006 7:23:27 PM End: 4/22/2006 7:23:27 PM HOUR

Show Equation | Calculate

CA32WA1

$$k = \frac{CA32F301*(-10.7*(P_g+1.013)+2128)}{(102.51*(P_g+3.013)^{0.2414}-CA32T304)-(102.51*(P_g+1.013)^{0.2414}-T_{prod-in})} / A$$

$$\ln\left(\frac{(102.51*(P_g+3.013)^{0.2414}-CA32T304)}{(102.51*(P_g+1.013)^{0.2414}-T_{prod-in})}\right)$$

$$Tprod-in = \frac{(CA31F_{KB1})*CA31T110+(CA31F_{KB2})*CA31T210+(CA32F_{KB1})*CA32T110+(CA32F_{KB2})*CA32T210}{(CA31F_{KB1})+(CA31F_{KB2})+(CA32F_{KB1})+(CA32F_{KB2})}$$

$$CA31F_{KB1} = CA31F101+CA31F102+CA31F103$$
$$CA31F_{KB2} = CA31F201+CA31F202+CA31F203$$
$$CA32F_{KB1} = CA32F101+CA32F102+CA32F103$$
$$CA32F_{KB2} = CA32F201+CA32F202+CA32F203$$

A =198m2

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Process Monitoring

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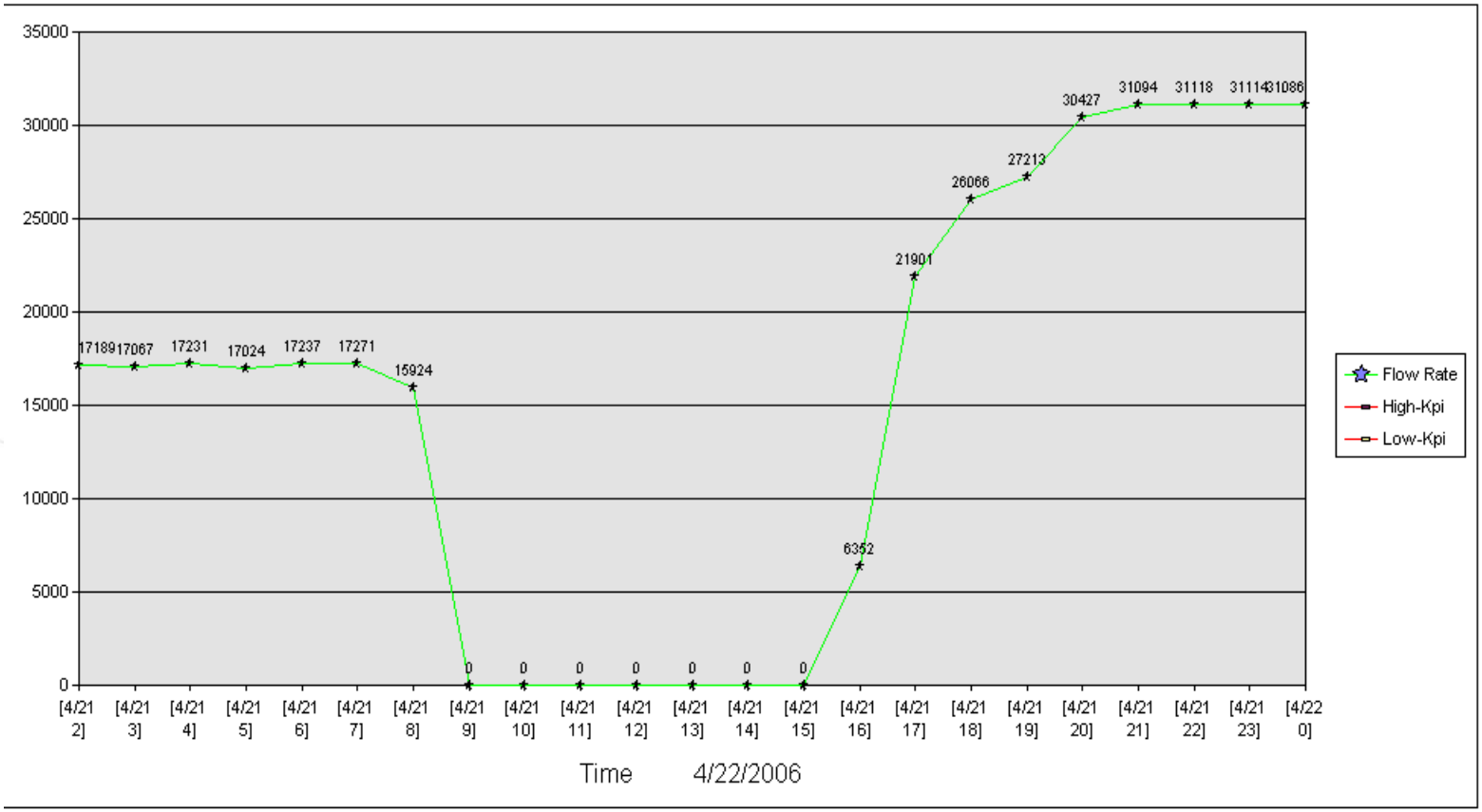
Export To Excel | Build Graph



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Management Information

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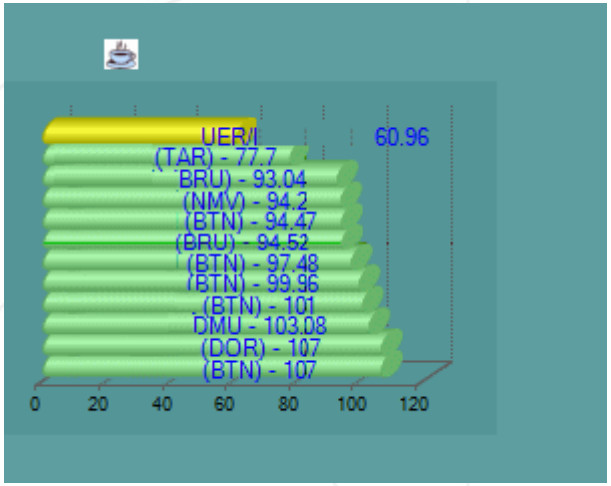
TAR	
Unit	TAR
OeeValue	77.7
UnitOfMeasure	t
DailyProd	25
DailyCapacity	32
LosscodeL1	Materias primas/Auxiliares
LosscodeL2	Materias primas
LossKpi	Quality



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AF - Tank Transfers Project

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Develop and implement a Transfer Program in PI/ DCS to help plan, monitor and document product transfers.

Web-based application that will record and monitor the manual transfers - Allowing the field operator to setup monitor and record the following items:

- Source tank
- Receiving tank (include: Rail Car, Tank Truck, Tank Car, Barge etc.)
- Transfer resource (which line, hose or other piece of equipment to transfer
- Date and time of transfer start and finish
- Estimate time remaining to complete transfer
- Tank Levels now and after transfer
- Monitor all transfers past and present.
- Record completion of special monitoring requirements for transfers

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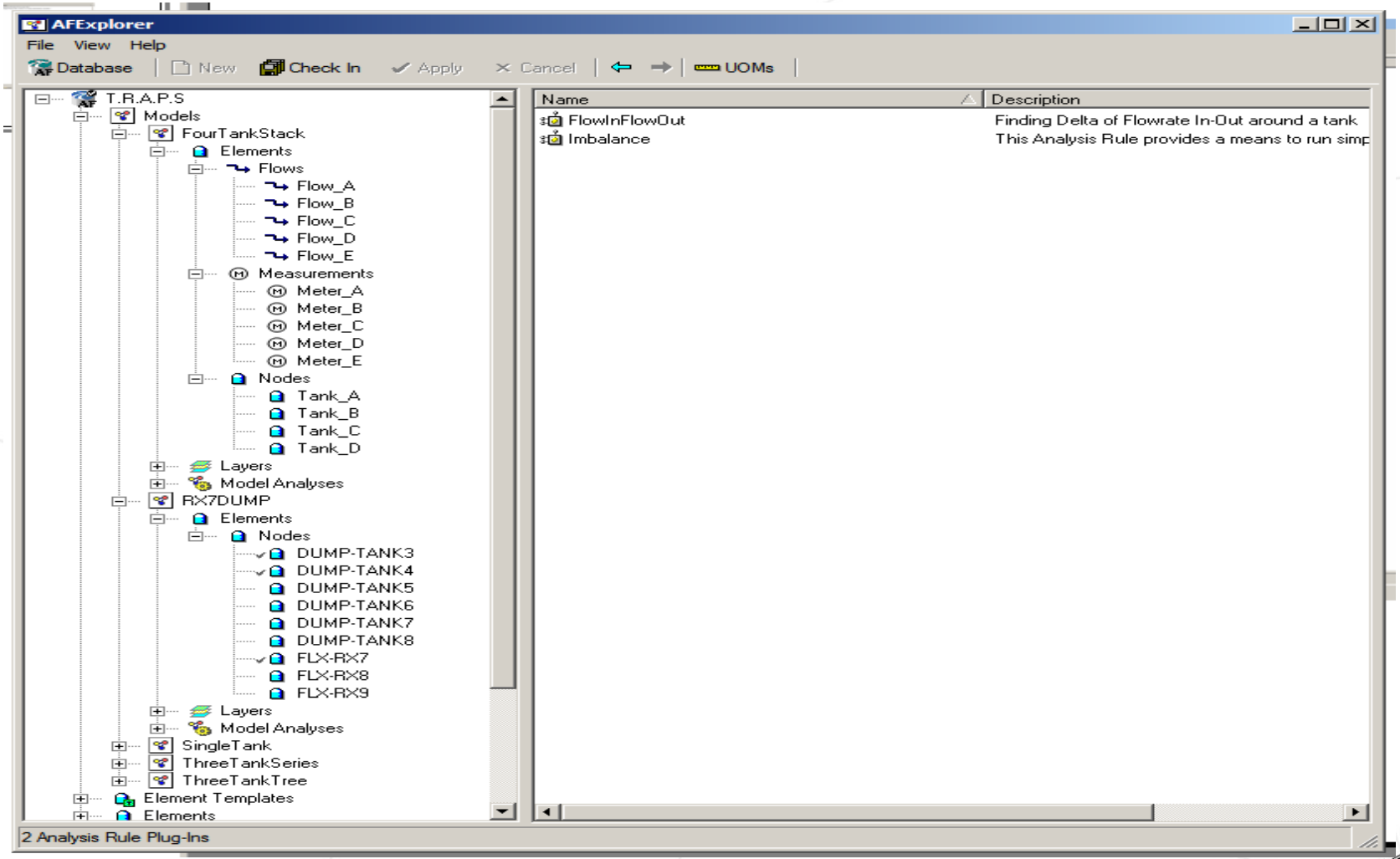

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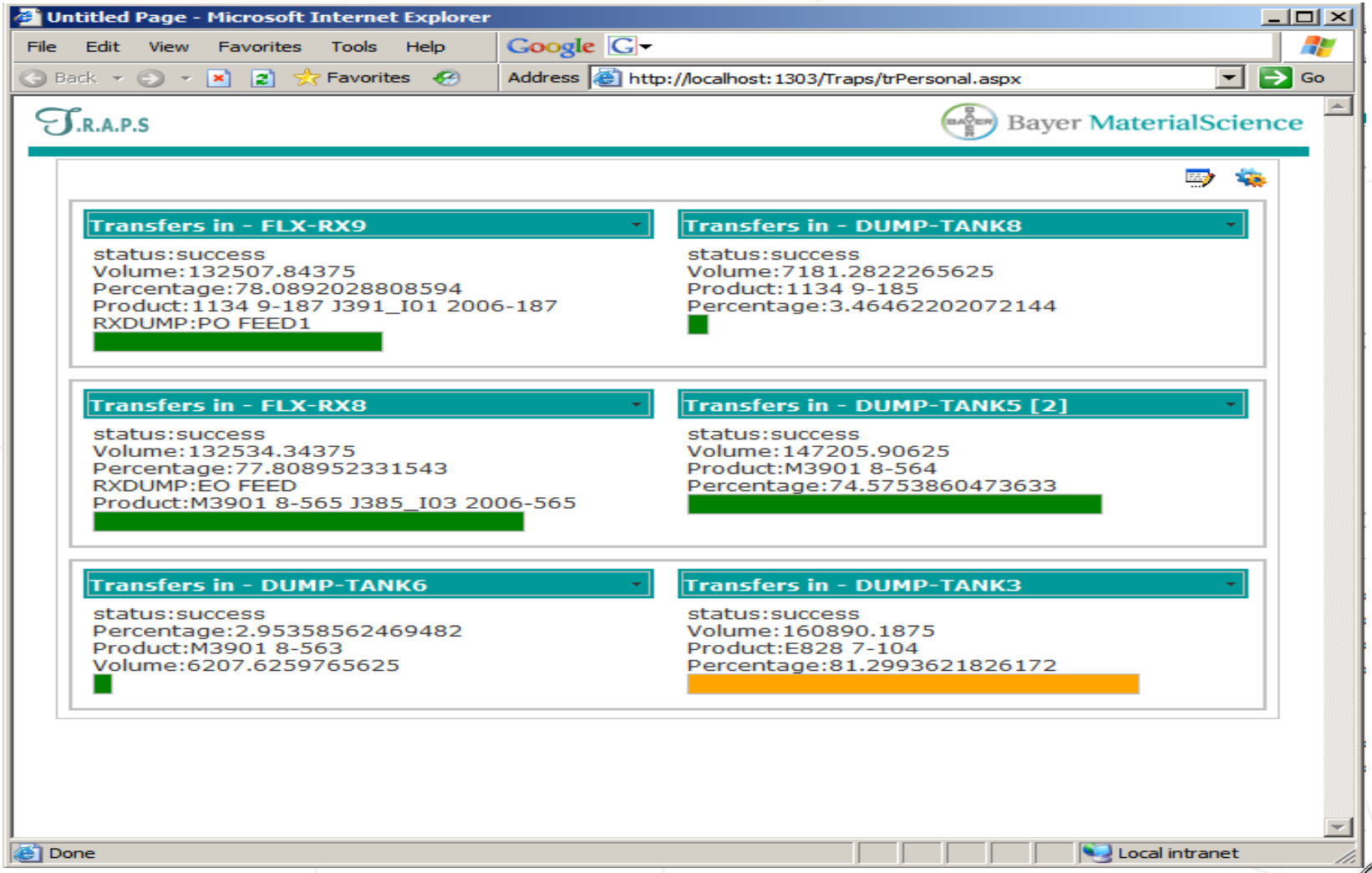

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What Have We Learned by Using AF ?

- Obtaining more value from our installed base
- Manageable data from various sources using a hierarchal naming convention versus tags
- Store data only once, making PI available to all that require the information
- Consistency of applications
- Reusable applications
- Configurable development of templates and models
- Integration of our investment in custom programs into configurable PI applications
- Have one place to view the data from
- Configuration versus programming
- Completion time to implement reduced
- Time to ROI reduced
- Send data to the Web - engineers, operators, managers and view the data
- AF relationships developed will be used to produce ProcessBook displays

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