
REAL-TIME PERFORMANCE MANAGEMENT FOR THE ENTERPRISE
RtPM
SAN FRANCISCO PHILADELPHIA HOUSTON FRANKFURT
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REAL-TIME PERFORMANCE MANAGEMENT FOR THE ENTERPRISE
RtPM

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Increasing refinery yields and profitability using RtPM

Agenda

1. Iplom refinery presentation
2. Performance management
3. From PI system to RtPM
    1. Planning
    2. Measuring & reconciling
    3. Calculating indicators
    4. Distributing information
4. Return on investment
    1. Yields profitability
    2. Organizational
5. Future steps

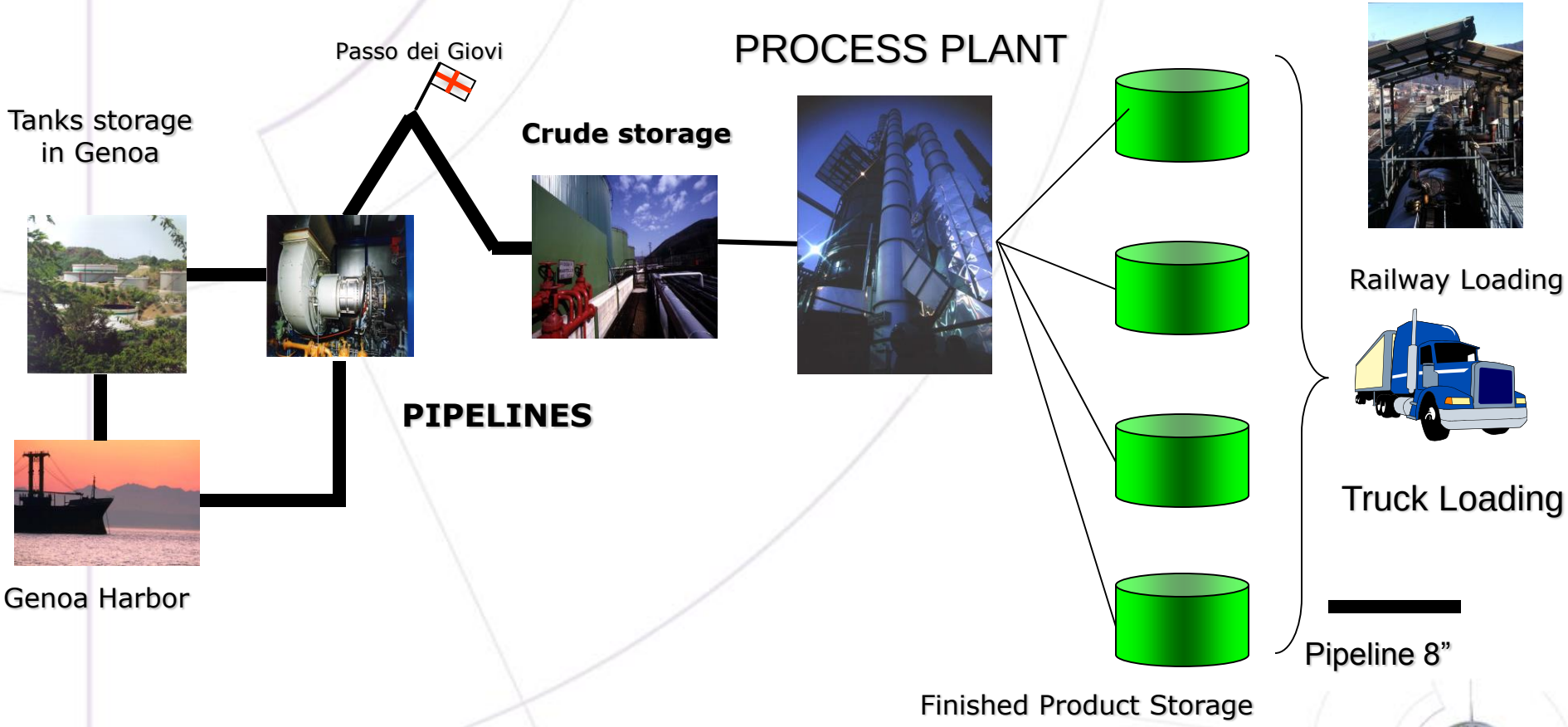
Iplom presentation

Refineries in Italy

IPLOM

Iplom presentation

Iplom Refinery



Iplom DNA: a agile refinery

- Iplom is a independent refinery focused on efficiency to create profit
  - Serving a variegated range of customers
  - Producing both conventional and niche products (e.g. LL Sulphur fuel oil, CO2)
- Production management is based on:
  - Agility in taking business opportunities
  - Rapidity in taking business decision
  - Time to market: very brief period from crude purchase to product sell
- To support these objectives, given the constraint of a limited storage capacity, the company needs to manage production dynamically
  - 160 crude switches per year
  - Different plant operating modes

Performance Management

- A continuous and iterative approach in production management supported by a flexible environment:
  - define production target
  - assign plan to operations
  - reconcile measures and calculate KPIs
  - report and distribute performances
  - evaluate to act and correct

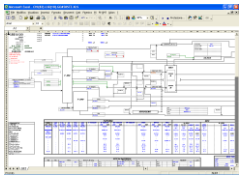
Performance Management

- Applied to different timescales to give support to different company functions
  - Hourly:
    - to operating shift people
  - Daily:
    - to production and planning manager
  - Weekly/monthly:
    - to refinery manager

From PI System to RtPM

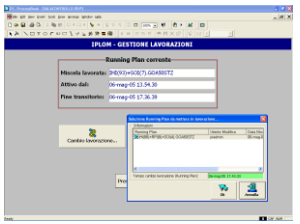
- 2001 - Reconciling Refinery yields
  - PI System, Sigmafine3, PI-ProcessBook, PI-DataLink
- 2003 - Integrating planning tools and calculating KPIs
  - PI ModuleDB, PI-ACE
- 2004 – Distributing information across the company
  - PI-ICE
- 2005 – Migration to Sigmafine4, evaluating RtPortal
  - Sigmafine4, RtWebParts

Functional overview



Running plan definition

PI-ModuleDB



PI-PB

Assign plan to operations

Cockpits

ICE
RtPortal

PLAN

EXECUTE

EVALUATE

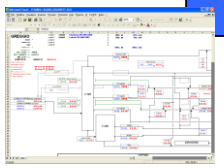
REPORT

MEASURE

PIACE

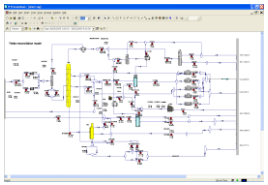
Automatic procedures

PI-Datalink
PI-PB



Reports

PI-AF
Sigmafine



Modeling & Reconciliation

PIACE

KPI calculations

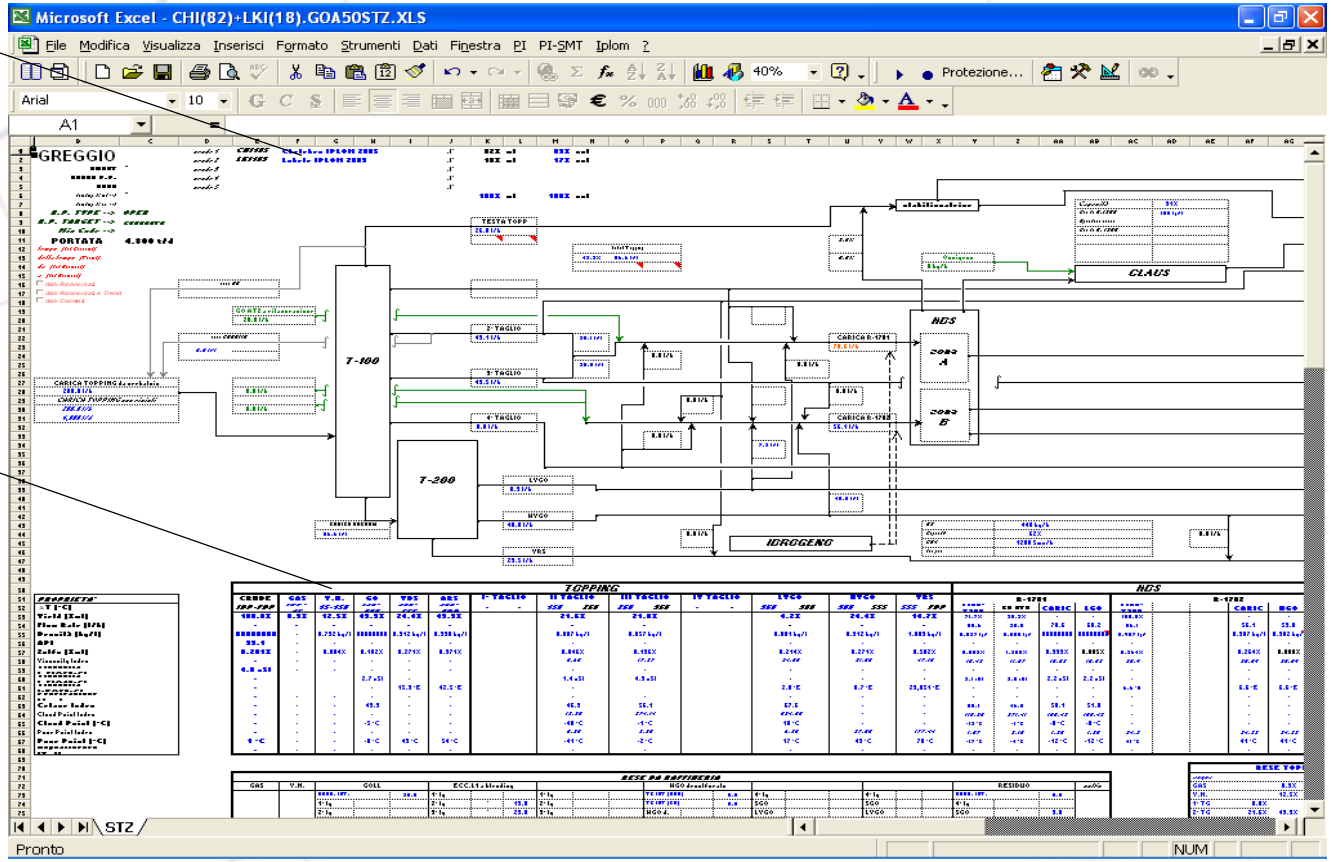
- Consistency through OSIsoft infrastructure

Running plan definition

- A “running plan” defines all the information needed at execution time to process a specific crude or crude mix to obtain desired products and qualities

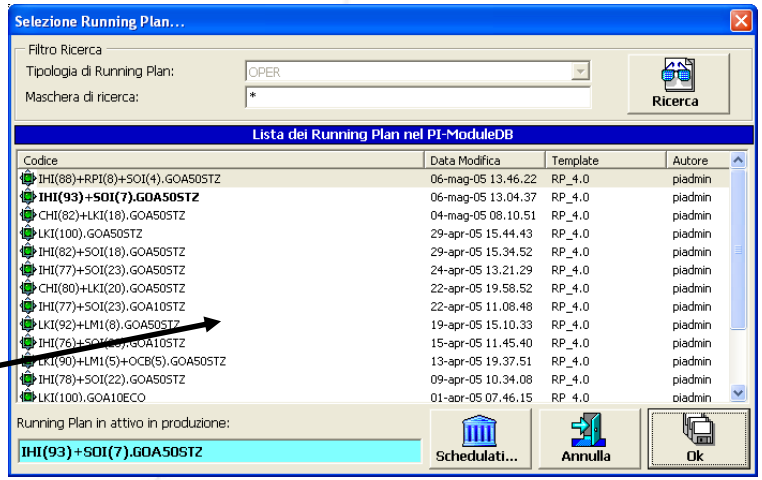
Define for a crude or a crude mix

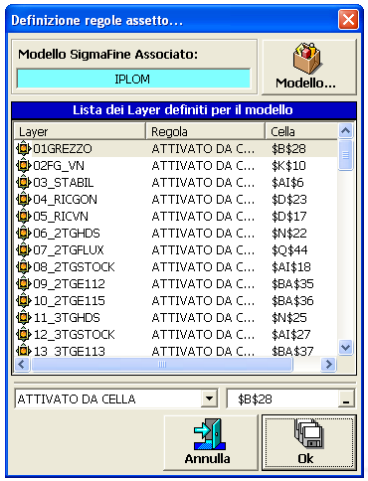
Calculate expected theoretical yields and qualities using crude libraries and algorithms



Running plan definition/2

- Microsoft Excel as frontend: simple, powerful, flexible
- All running plan target data centralized and stored in the PI-ModuleDB
- Support multiple calculation templates
- Select which Sigmafine4 layers will be enabled to ensure consistent reconciliation at execution time



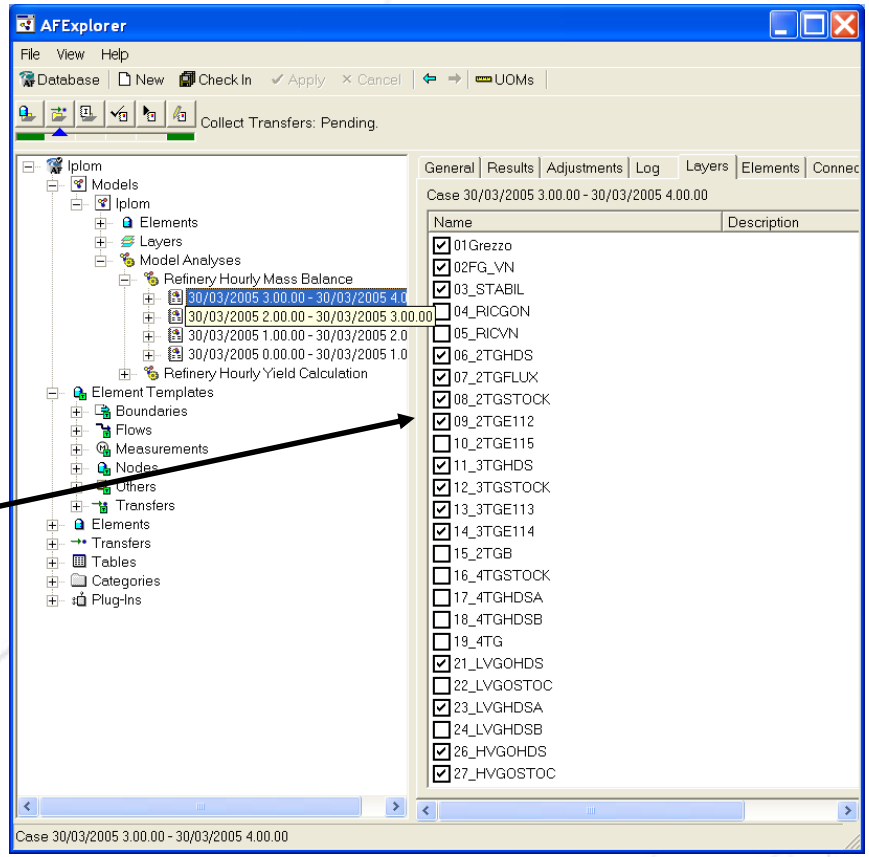


Assign running plan to operations

- Shift chief declares crude switch from the control room using PI-ProcessBook
- PI-ACE automatic procedures setup all the systems for execution:
  - notify Sigmafine4 model enabling layers needed to reconcile current configuration
  - notify external systems:
    - send target values to advanced control system
    - notify accounting system

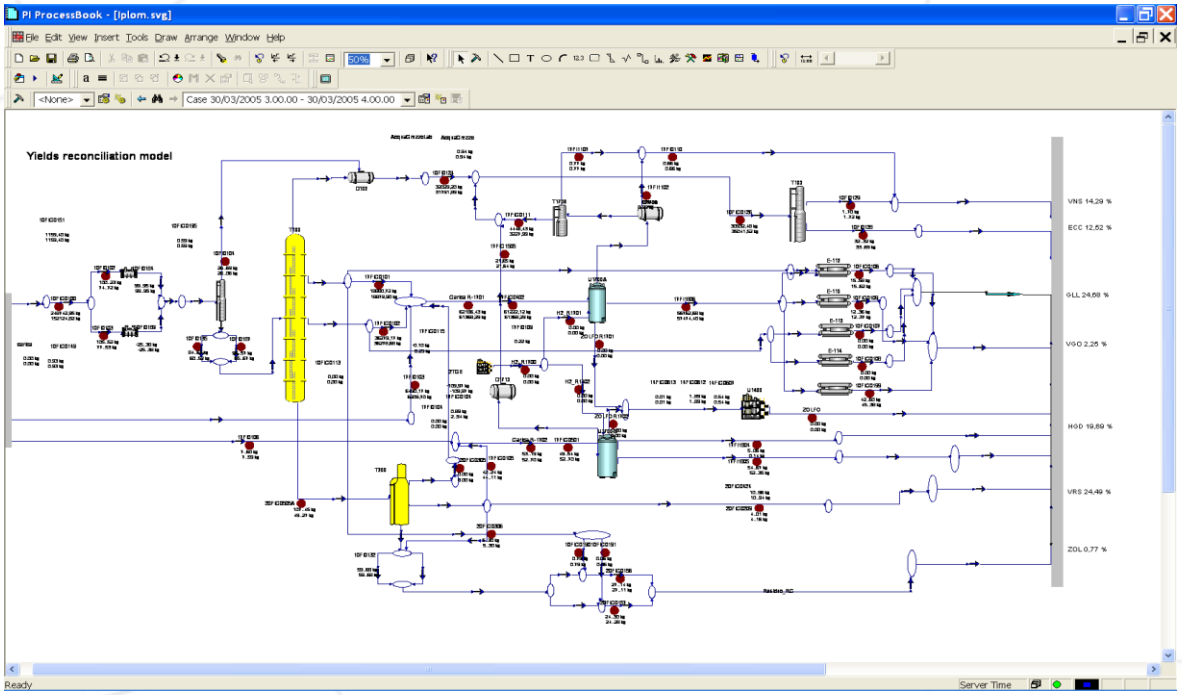
Reconciling measures

- Reconciliation is the first step to consolidate process data before calculating performances
- Sigmafine refinery plant model designed for yield reconciliation
- The model is composed of several (50) layers which can be combined to represent different plant configurations
- Reconciliation is done automatically every hour



Migration to Sigmafine4

- Some feelings about migration from Sigmafine3 to Sigmafine4
  - “Smooth” process helped by automatic conversion utilities
  - Powerful configuration and maintenance tools (Excel addin, AF Explorer)
  - Use advanced graphic functions available in PI-ProcessBook (dynamic symbol behaviour, layering, annotation by drag&drop, …)
  - Use std tools (PI-ACE) to implement automatic reconciliation procedure

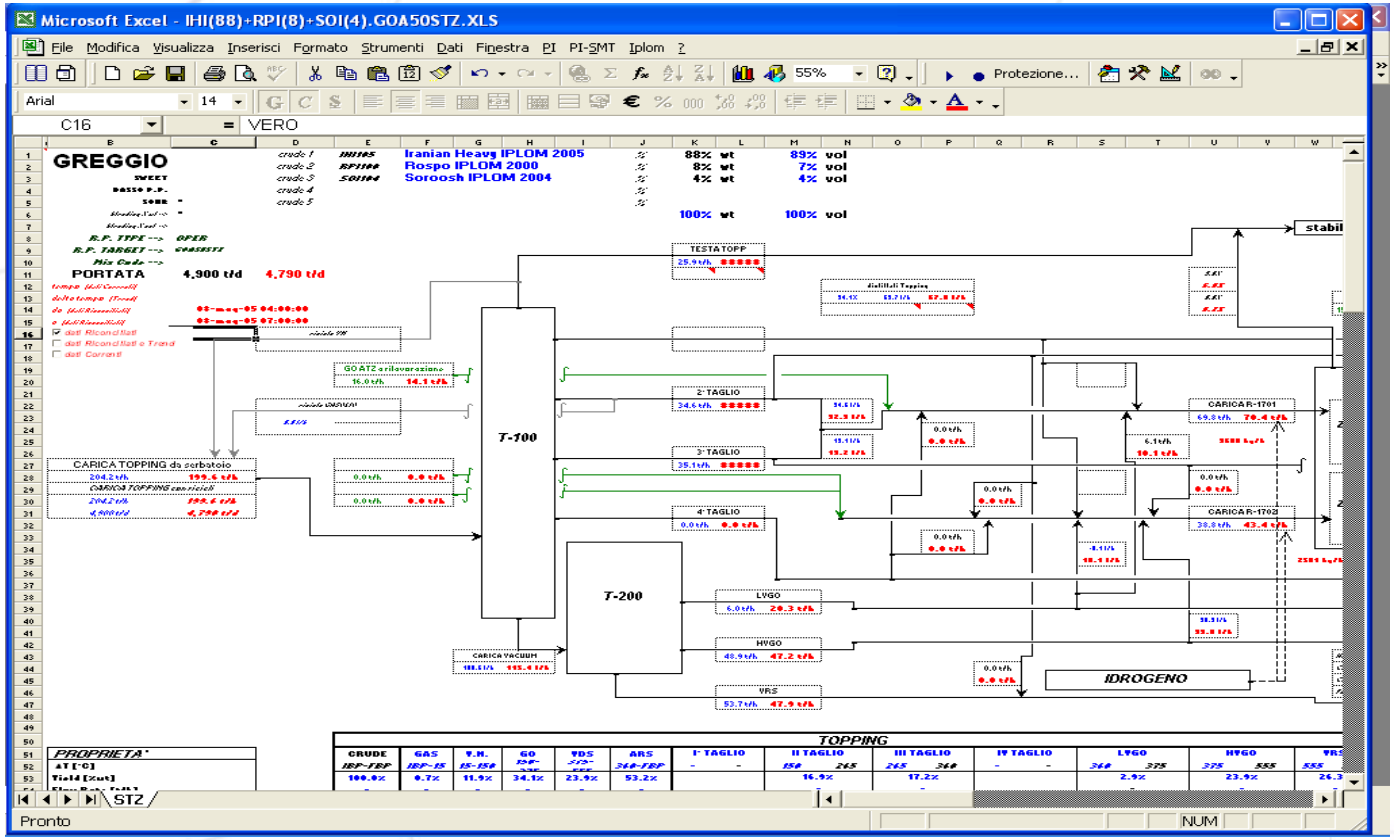


Calculating performances

- Actual yields calculated via PI-ACE based on reconciled values:
  - Per hour
  - Per shift
  - Per running plan
- Overall KPIs calculated via PI-ACE
  - Performance (positive when producing more valuable products than expected)
  - Deviation (gives indication of the distance between target and actual yields)

Reporting performances

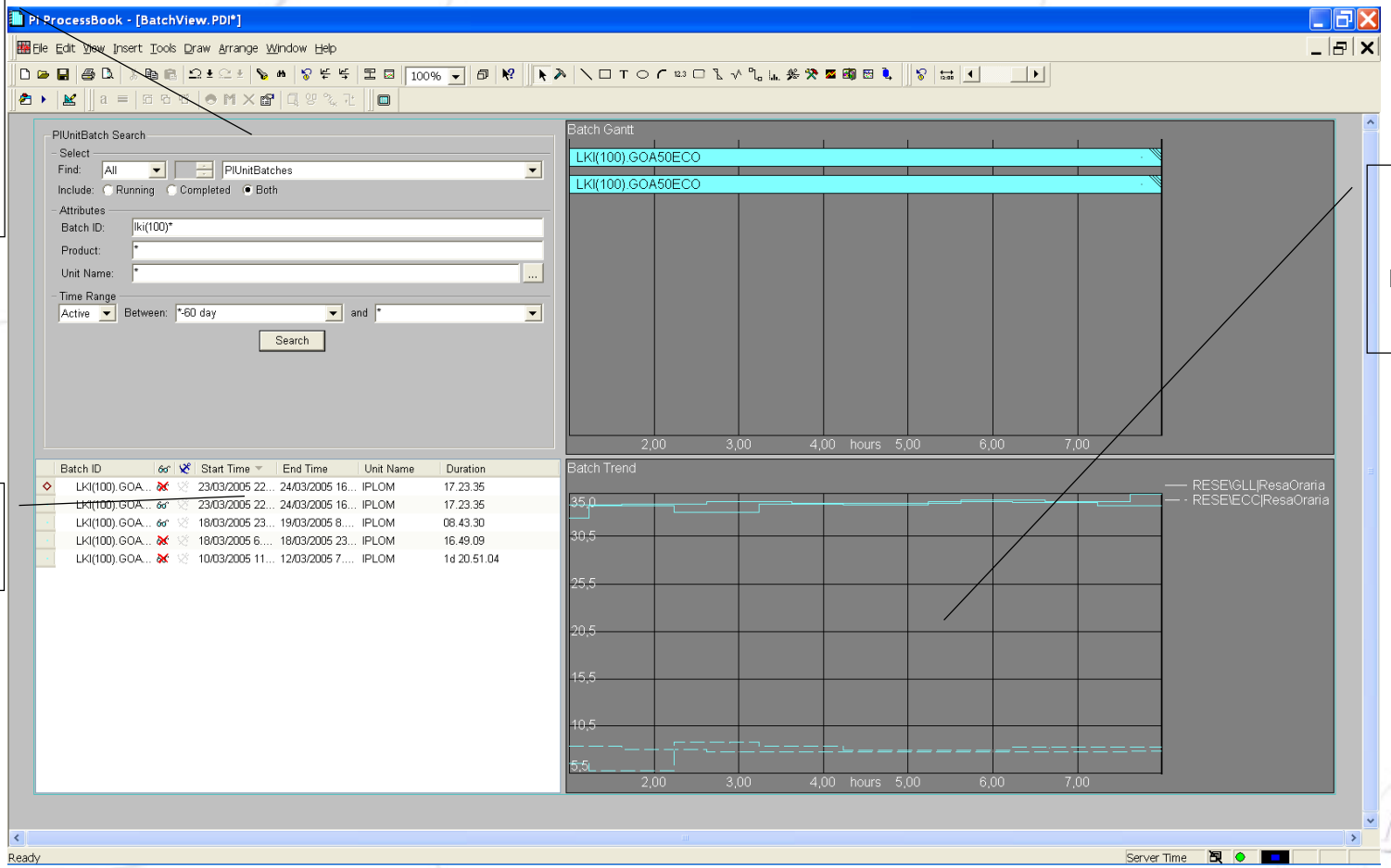
- Using planning tool to evaluate target vs. measured vs. reconciled



Evaluating performances

- Using std tools (PI-BatchView) to analyze yield profiles

Select search parameters (time, running plan code, crude)

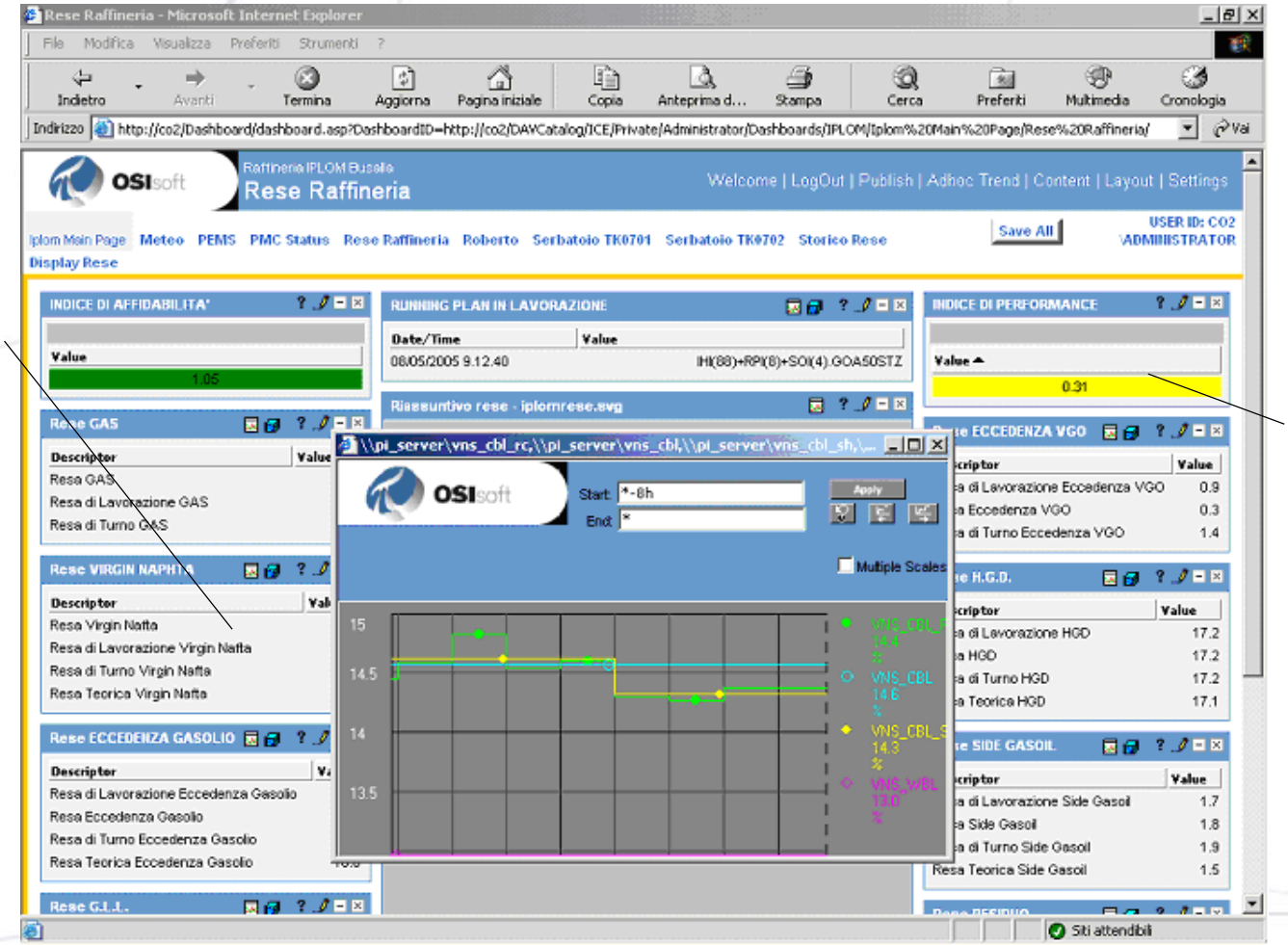


Selecting running plan

Comparing yield profiles for homogeneous running plans

Distributing indicators across the company

- Sharing information through PI-ICE cockpits

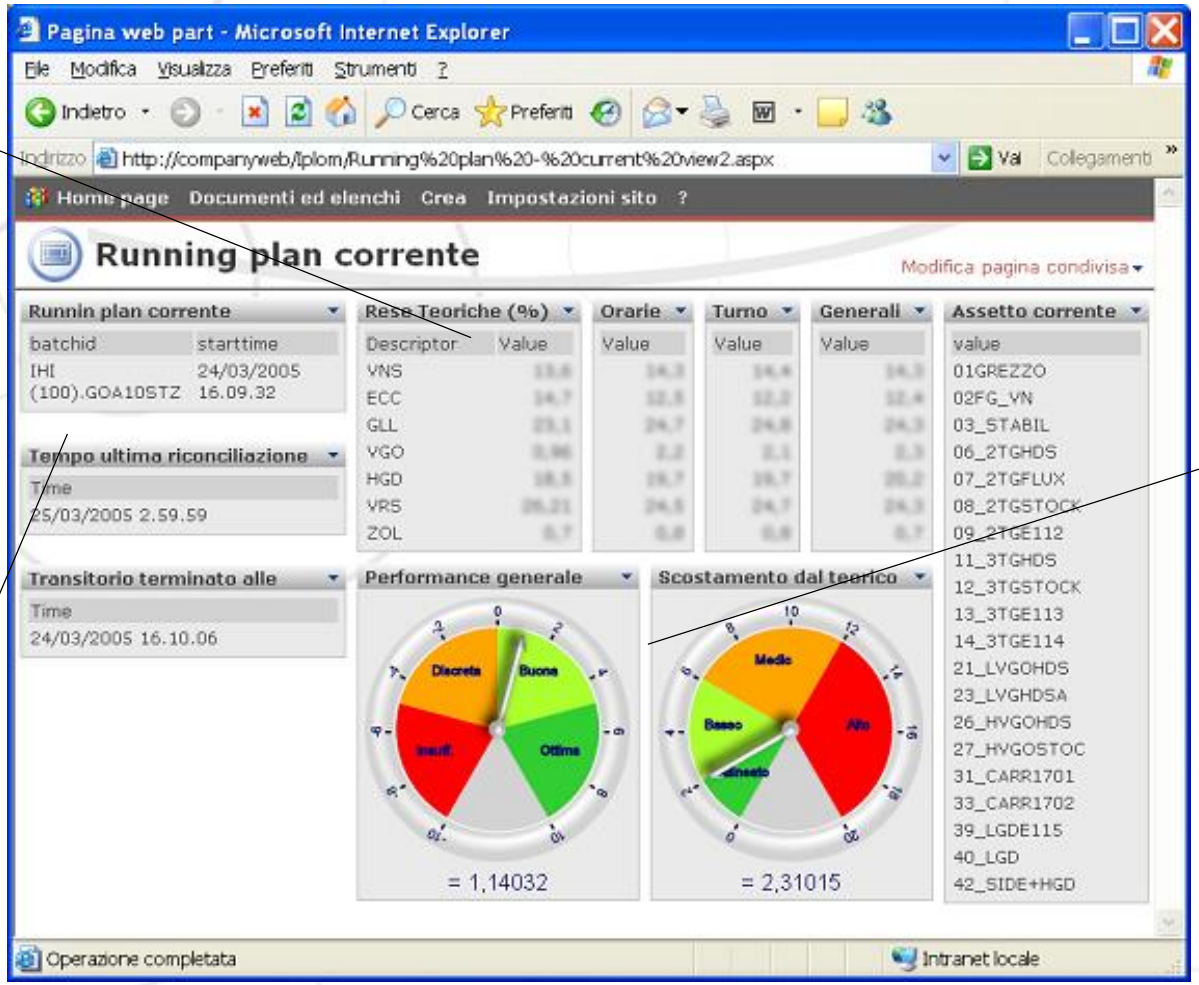


Yields comparison (teo, hourly, shift, campaign)

Performance indicators

Evaluating RtPortal

Yields comparison (teo, hourly, shift, campaign)



Current Running plan general info

KPIs representation

Return On Investment

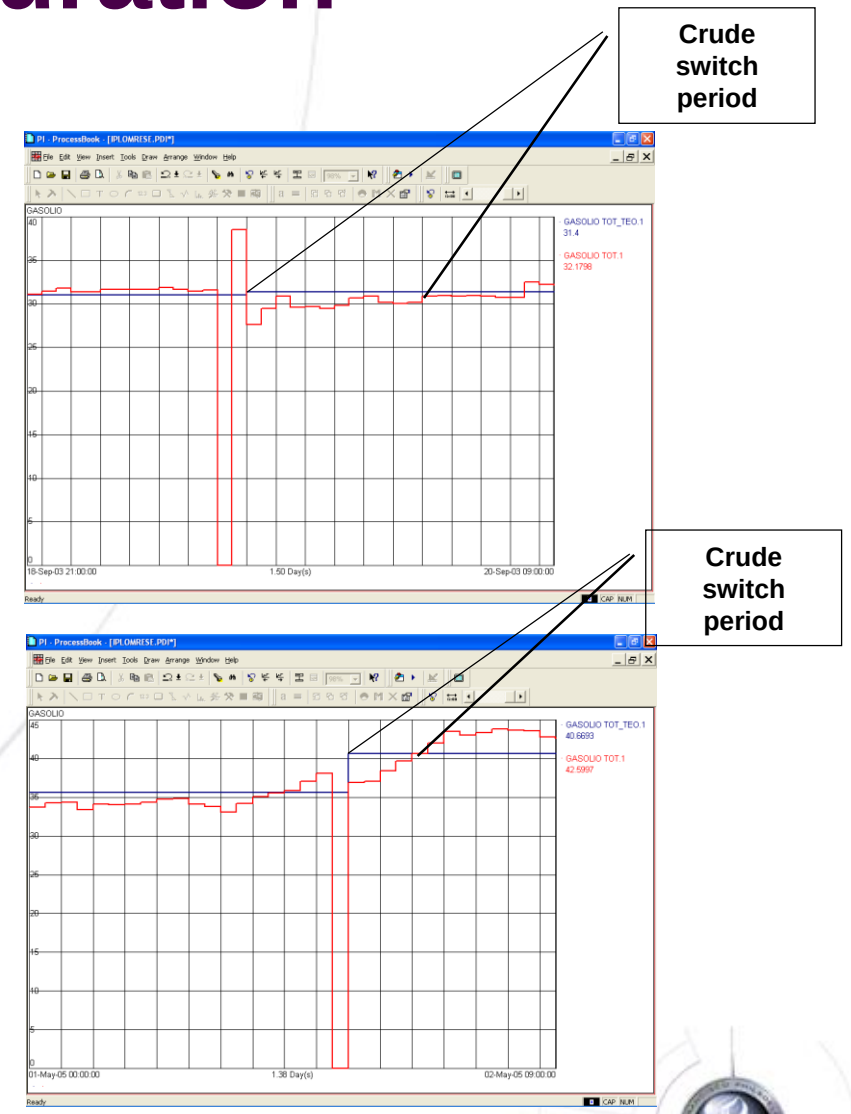
- The iterative approach of performance management keeps the company focus on reaching the target objectives
  - Online performance monitoring in control room allows to rapidly identify yield degradation due to incorrect operating parameters
  - Historical analysis allows the production manager to redefine better targets starting from the improved performance of the refinery

ROI: increasing yield profitability

- e.g. Diesel yield
  - Analyzing homogeneous data related to “sweet” crudes:
    - 2003 actual average diesel yield 37,4%
    - 2004 actual average diesel yield 39,6%
  - Average actual diesel yield increased due both to investments on plants and to performance management
  - Historical analysis on diesel yield showed that the average increase due to performance management amount to about 0.8% in the period 2003-2004
  - This lead to a profit increase estimated in 1 M$ per year

ROI: crude switch duration

- Monitoring reconciled vs. target helped shift people to better control crude switch operations
- This result in reduction of the time needed to complete crude switch and to reach the targeted performance
- Just considering the loss of diesel (degradation to fuel oil) during the crude switch, the estimated saving is about 0.3 M$ per year



Organizational benefits

- The reduction of the deviation between planned and actual yields (e.g. diesel from 2.2% to 1.3%) demonstrated how sharing information and involving people helped to reach the refinery targets
- The smart integration reached using OSI infrastructure allowed to focus engineers on the real business objectives
- Performance management approach allowed to keep production and plant management under control with a lean organization

Future steps

- Performance management
  - Evaluation of blending efficiency to optimize the utilization of low-cost components
  - Composition tracking of complex operations between the coastal tanks and refinery to improve the quality of crude mix feed
- RtPM evolution
  - Introduction of RtPortal solution to distribute KPIs