REAL-TIME PERFORMANCE MANAGEMENT FOR THE ENTERPRISE

RtPM

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OSISOFT USER CONFERENCES 2005

Miguel Angel Sinobas

Advanced Control and Production Systems

Repsol YPF – Petronor

PI & The Production Data Systems

· Mission, Vision and Values ·

Scope

- Repsol YPF – Oil & Gas Company

- Outline

- Production Data Systems

- Laboratory Information Management System

- Production Information System

- Plant Information – PI

- Data Exchange – Interface System

- PI: Mission, Vision and Values

- PI Environment

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Repsol YPF Company

- Refining

- Refining Capacity

    > 1.2 MBOpD

- Hydrocarbon production

    > 1.1 MBOEpD

- Oil and Gas reserves

    > 5400 MBOEpD

- Business in 28 Countries

MBOpD Millions Barrels Oil per Day - MBOEpD Millions Barrels Oil Equivalent per Day

Repsol YPF Company

- ## Refining

  - Leader in Spain and Argentina

  - 9 Refineries: 5 Spain-3 Argentina-1 Peru ✂ Shares: 2 Brazil-1 Argentina

  - Among 10 major private Oil Companies in the world

  - Third largest Company in LPG business > 3 Million Tons

Petronor Refinery

- Production

  - Major Shareholder:

    Repsol YPF (86%)

  - 2004 Profits:298.5 MM €

  - Inversion Plan 2005-2009

    Existing Units:93,128 MM €

    New Units:750,572 MM €

  - Production:240 kBOEpD

  - 20% Exportation

  - 80% Spanish Market

  - Quality Management integrated: Safety, Quality, Environment
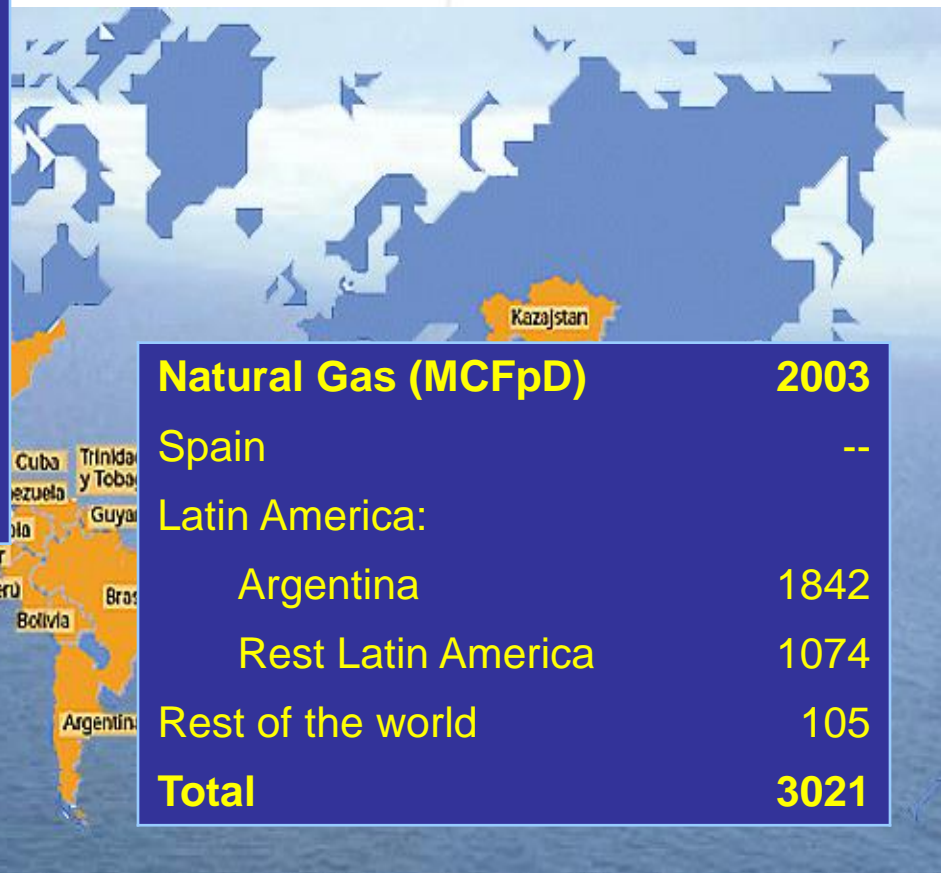
kBOEpD kilo Barrels Oil Equivalent per Day

Repsol YPF Company

- Exploration

Oil Production (kBOpD)	2003
Spain	4
North Africa and Middle East	60
Latin America:	
Argentina	432
Rest Latin America	98
Rest of the world	--
Total	**594**

Natural Gas (MCFpD)	2003
Spain	--
Latin America:	
Argentina	1842
Rest Latin America	1074
Rest of the world	105
Total	**3021**

kBOpD Kilo Barrels Oil per Day - MCFpD Millions Cubic Feet per Day

Repsol YPF Company

- ## Service Station Network

  - \> 6600 Outlets in Europe and Latin America

  - Leader in Spain and Argentina

  - Most important operators in Peru and Ecuador

Portugal: 114
Italia 23
Espana: 3.611
Ecuador: 124
Peru: 131
Brasil: 515
(incluye el 100% de las 78 de WAL)
Chile: 186
Argentina: 1.910
(incluye el 50% de las 65 de Refinor)

Repsol YPF Company

- Chemicals
  - 5 Industrial Complexes: 2 in Spain – 3 in Argentina

  - Markets in Southern Europe and Mercosur Countries

Repsol YPF Company

- ## Gas and Power
- Gas distribution to more than 8.7 million Customers in Spain and Argentina

- Electric Generation – 2003

    - Spain – Cogeneration:3964 GWh, Combined Cycle:1577 GWh

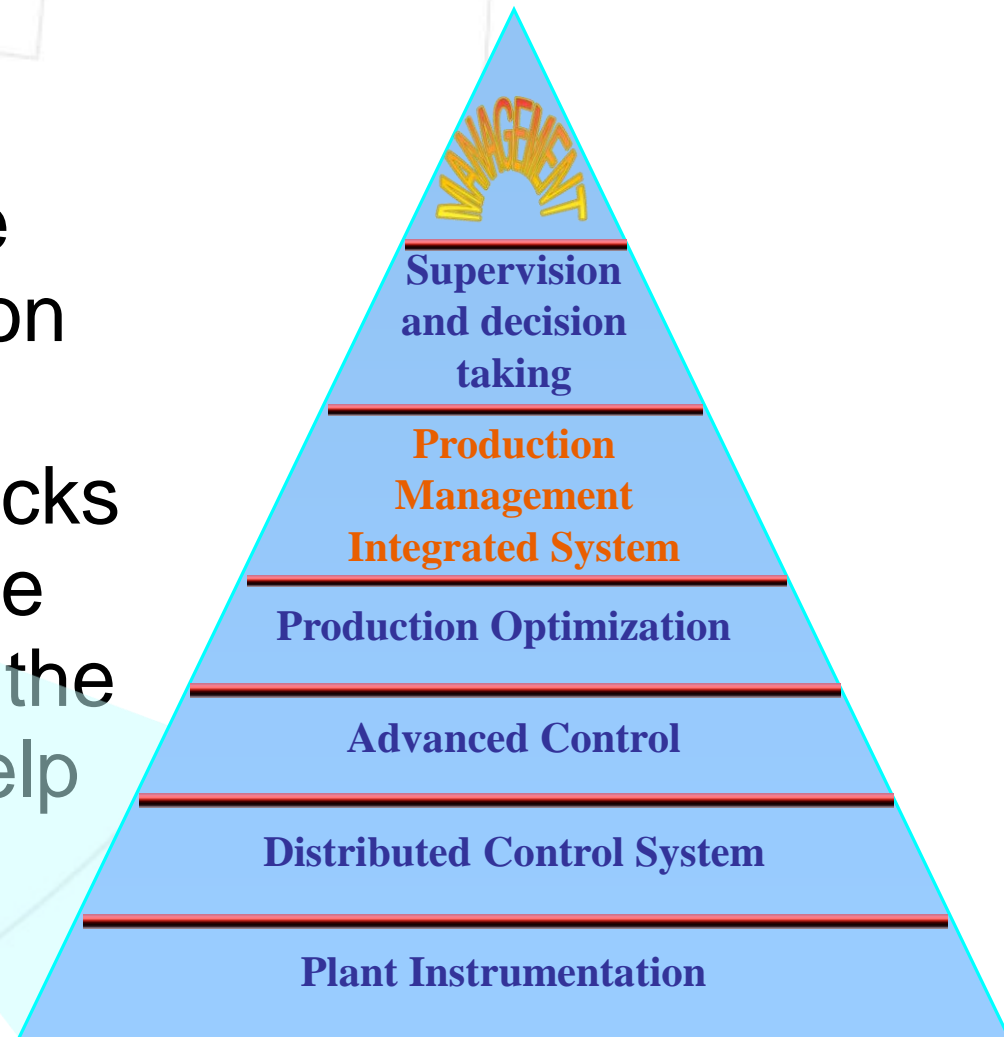   - Argentina – Net Power:1389 MW, Combined Cycle:540 MW

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Outline

- Production Data Systems provide the necessary information related to process, production units, stocks and products with the purpose to optimize the management and help decision taking

Pyramid (top to bottom):
- MANAGEMENT
- Supervision and decision taking
- Production Management Integrated System
- Production Optimization
- Advanced Control
- Distributed Control System
- Plant Instrumentation

Outline

- Production Data Systems are those involving the Systems and Applications designed to provide information about production, present or historical, in several ways:

1. Providing instruments data about temperature, flow, pressure, online analyzers, etc.

2. Offering Laboratory data about quality of different samples, products, etc.

3. Managing the stocks of storage elements, internal transfers, incomes and expenditures, etc.

Outline

- PI System is involved in these systems and acts in two ways:

1. Offering a real time and historical vision for the Plant

2. Acting as data shuttle (real time platform) to the rest of Production Data Systems

Outline

- PI System is the interface between the plant and the IT world as well as a Production Data System itself

DCS

PI System

Online Calculations

LIMS

Others

Production Information
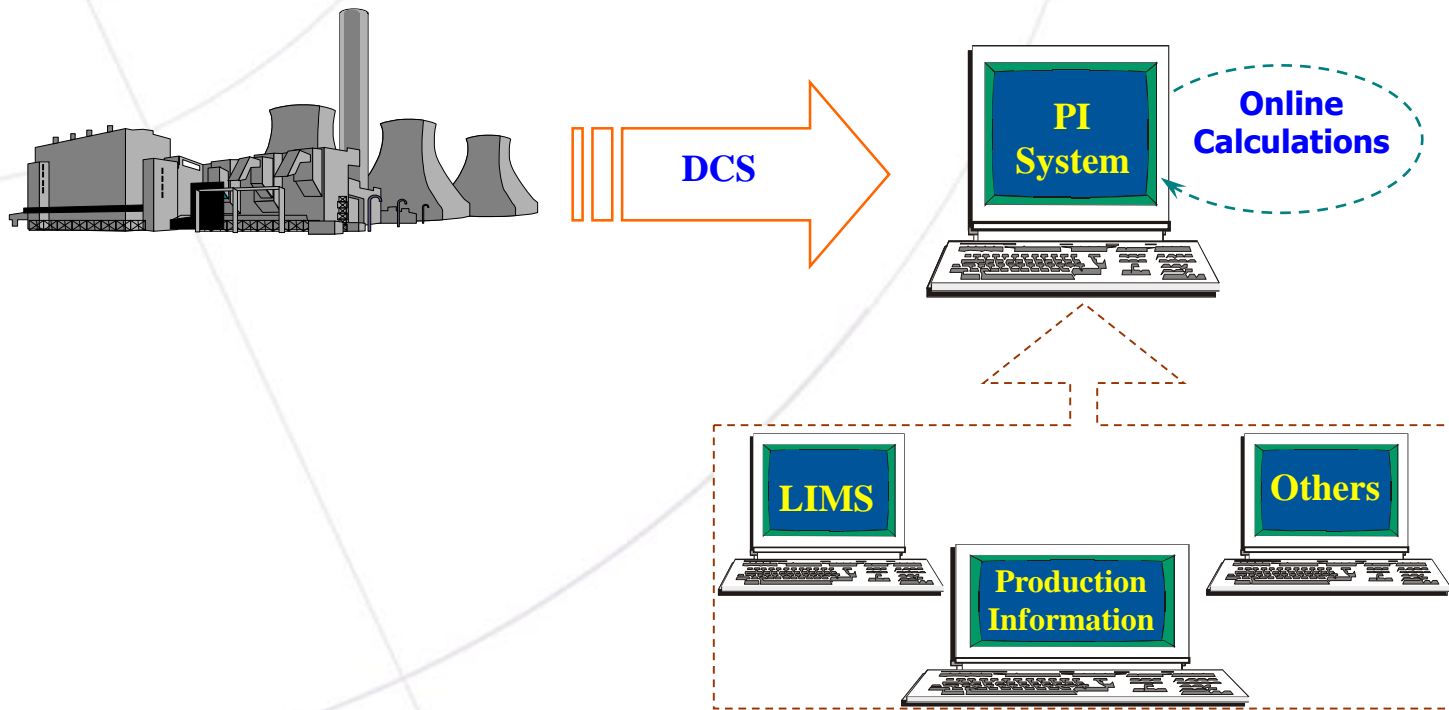
Outline

- This presentation will show the role of PI System in Repsol YPF Refineries along with the rest of Production Data Systems:

- Laboratory Information Management System
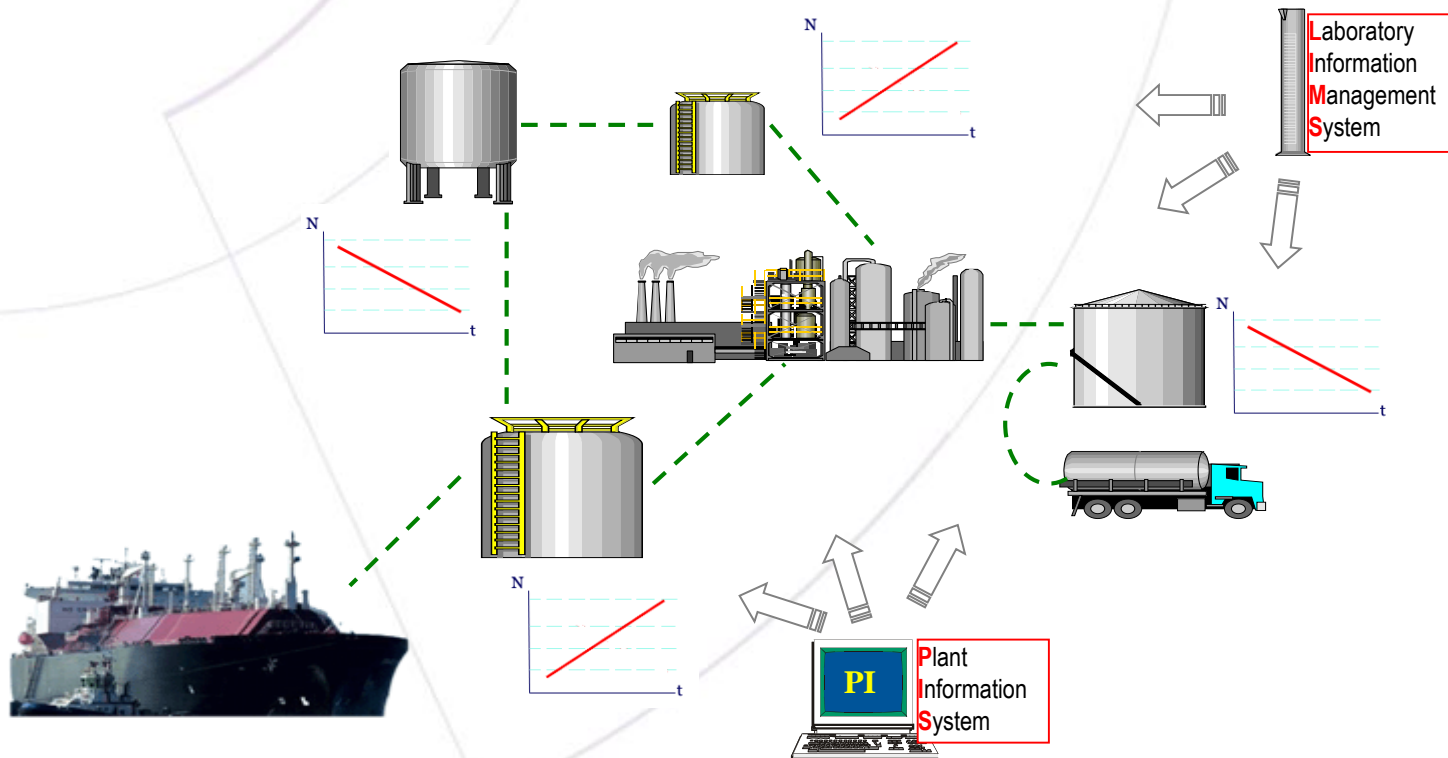
and

- Production Information System

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Production Data System

- Integrated Production Data System

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- **Laboratory Information Management System**

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Lab Info Management System

- LIMS working cycle
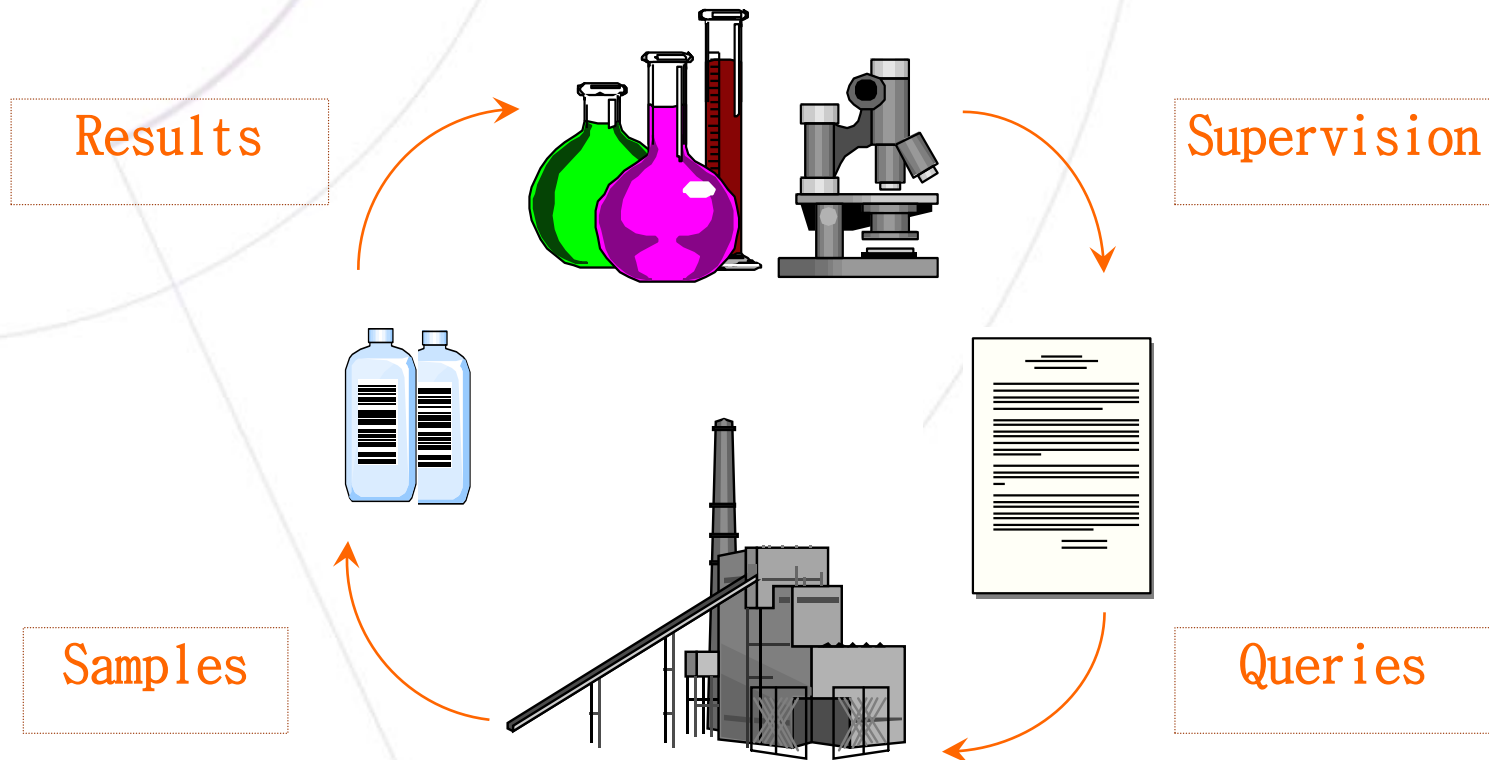
Results

Supervision

Samples

Queries

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Production Information System

- Management of stocks, internal transfers, material movements, incomes and expenditures, etc.

- Monitoring incoming Oils and calculating Production based on flow rates and Crude Oil Tanks composition

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Plant Information – PI

- Providing Plant Information for Company Personnel for Controlling ongoing plant-wide data

DCS

Router

PI System Server

LAN

Clients

Other Systems

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Data Exchange – Interface System

- Densities

- Molecular Weights

- Environmental Control
  (SO2, CO2 and Effluents)

Plant Information

Interfaces

Production Information System

Lab Informtion Mangmnt System
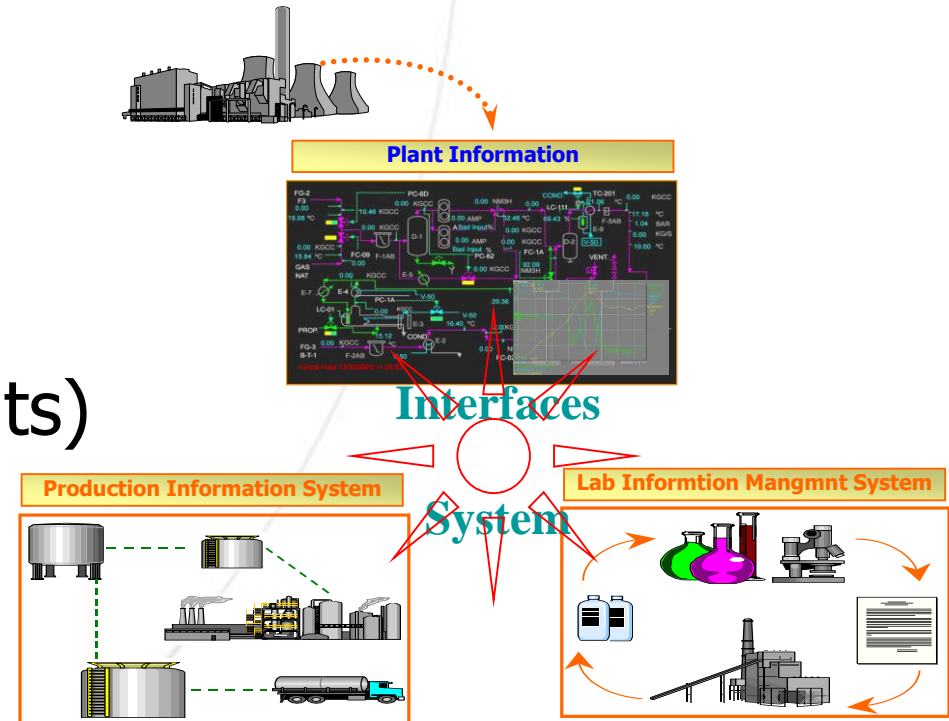
System

- Tanks and Pipelines Characteristics

- Process Units Operational Modes

- Flows, Temps, Pressures, Tank Levels …

Data Exchange – Interface System

- Exchange Scheme
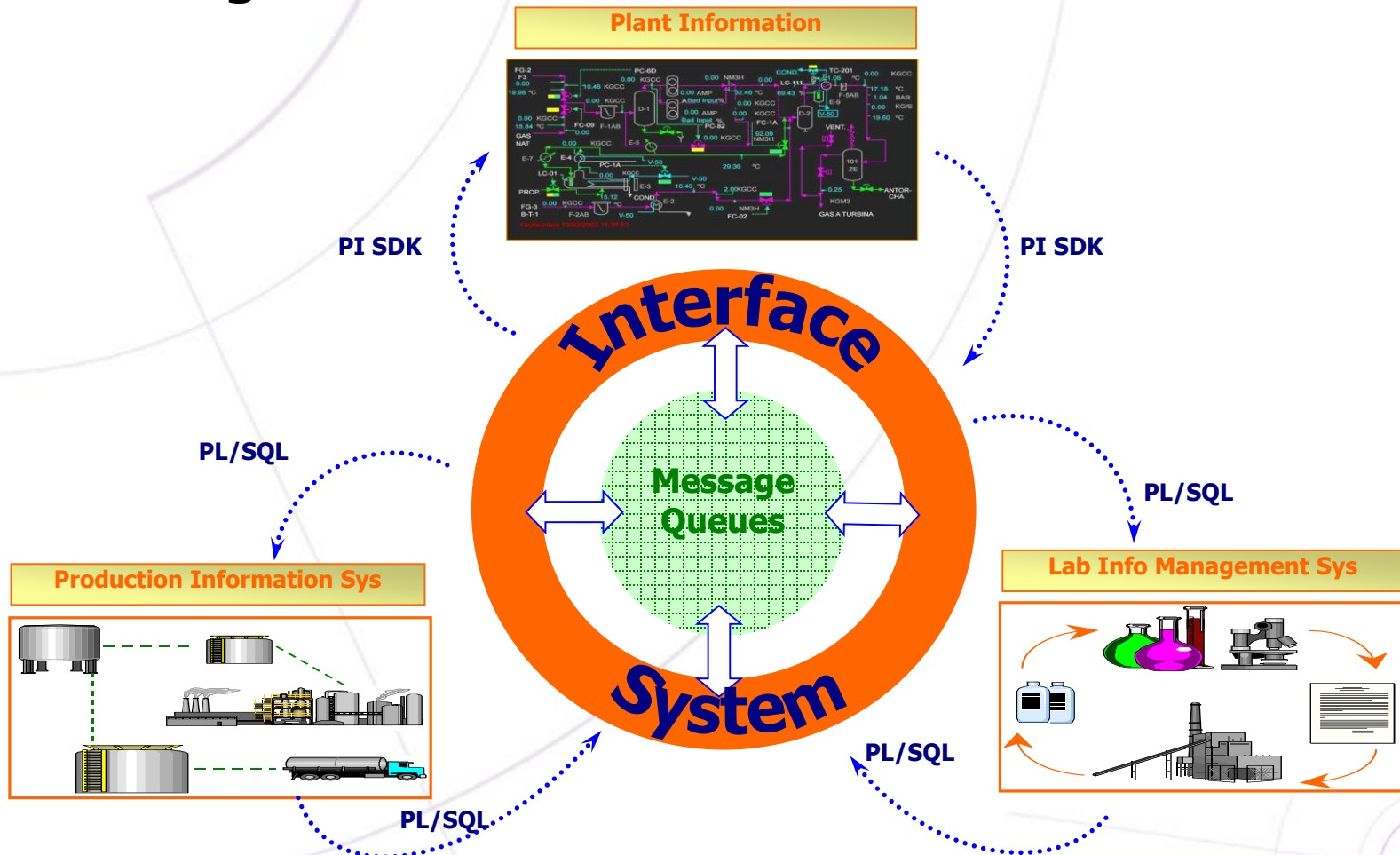
Data Exchange – Interface System

- Plant Information ➜ Production Information System

  - Levels, Temperatures, Pressures for stocks management
  - Hourly flows for process units mass and energy balances management

- Plant Information ➜ Laboratory Information Management System

  - Production units Operational modes
  - Samples timestamp for online analyzers

Data Exchange – Interface System

- Laboratory Information Management System ➔ Plant Information

  - Process quality variables to visualize along with Process variables

- Laboratory Information Management System ➔ Production Information System

  - Products Densities for Quantity Certificates
  - Densities and Molecular weights for Mass and Energy balances

Data Exchange – Interface System

- **Production Information System** ➔ Plant Information

  - Storage elements Status, as internal transfers concerns, in order to be visualized with the rest of data of tanks, spheres, etc.

- **Production Information System** ➔ Laboratory Information Management System

  - Storage elements Sample Logging

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Mission-Vision-Values

- ## MISSION

  - MISSION statement describes what business you're in and who your customer is. As such, it captures the very essence of your enterprise: its relationship with its customer

- ## VISION

  - VISION statement includes vivid description of the organization as it effectively carries out its operations. VISION is not true in the present, but only in the future

- ## VALUES

  - VALUES represent the core priorities in the organization's culture, including what drives members' priorities and how they truly act in the organization. VALUES describe what your management team really cares about

PI Mission

- Real time Performance Management provides performance monitoring to improve operations, prevent abnormal conditions, optimize processes and allows operations personnel to analyze Plant incident investigations

- Do things right and do the right things

- Glance at the Refinery in an easy and fast way

- The right information to the right person at the right time, making real-time and historical data available to users

PI Vision

- Taking actions in direct response to problems as they occur

- Providing historical context as something essential

- Monitoring environmental compliance

PI Values

- The easiest way to get profits with PI is the time saving, and we all know that time is gold

- Plant Information on the desktop

- Income and expenditures management

- Stocks and Internal Transfers management

- Help for other information systems management

TIME

PI Values

- Problems do happen and the time it takes to respond correctly determines the degree of success or failure of the business

- Production planning in comparison with actual production data in real time

- Application to control and avoid pump vibrations or help energy consumption management

- Skin points control in heaters to avoid inoperative periods

- Variables visualization to continuously control the process

INFORMATION

PI Values

- RtPM stores and retrieves raw data and analytical information for optimization, performance monitoring, troubleshooting, process specification and reporting

- Production engineers and plant operators can access plant-wide data for technical, environmental and economic analysis, isolating profitable operation as well as conflicts or inefficiencies

- Dollar value of a refinery operating gap. See instantly where the plant is losing money and where it is performing according to plan

OPTIMIZATION

PI Values

- TIME is money

- INFORMATION is money

- OPTIMIZATION is money

PI Values ⇨ ROI

Return of Investment

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PI Environment

- PI ProcessBook
- PI ActiveView
- PI DataLink – PI SMT
- PI DAP (API – SDK)
- Sigmafine
- PI OSIOPC Server
- PI OPC Client – Honeywell OPC Server HCI
- PI Performance Equations – PI Totalizer
- PI ACE
- PI APS
- UDS
- Redundant Server (HP - Blade) Windows 2000

Displays Navigator

- PI ProcessBook – Developer

- PI ActiveView – Visualizer

- Displays File Service

- HTML, Java – Navigator Menus

- Oracle/SQL Server – Menus items, User validation

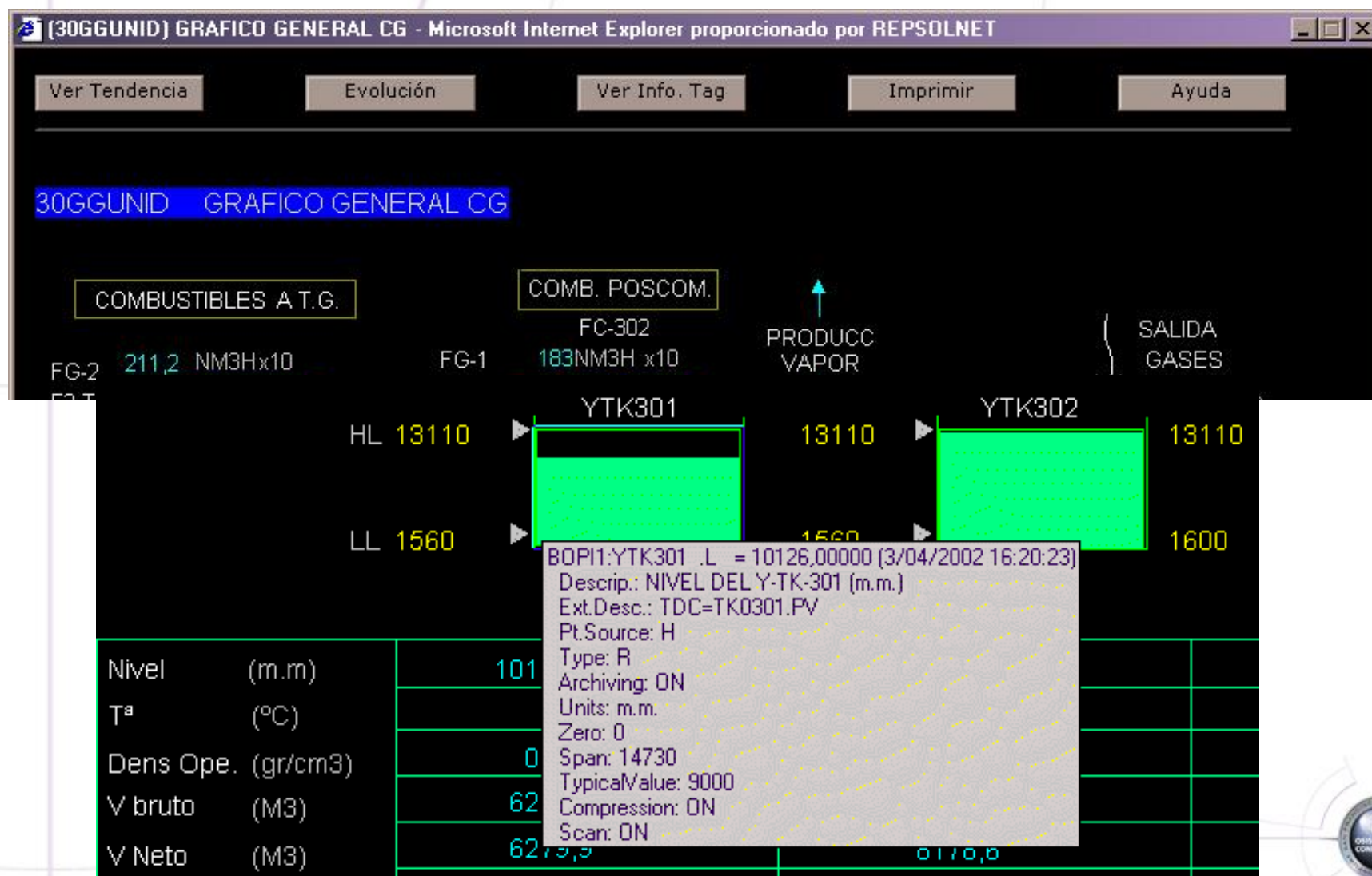# Displays Navigator
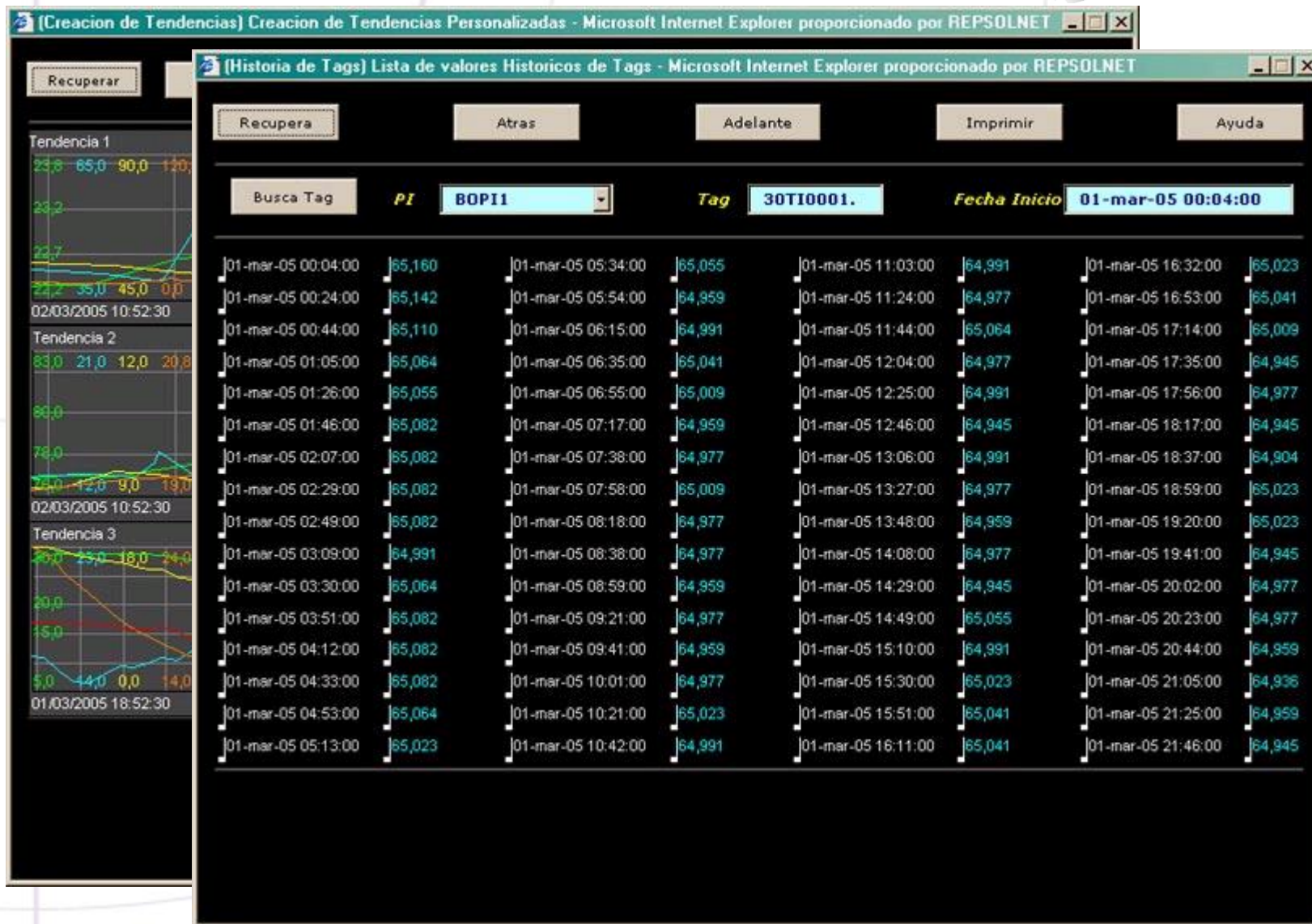
Displays Navigator

Displays Navigator

● VB Script – Additional functionality

- Complete Tool Tip information

- Evaluation Time on displays

- Display Trends

- User Trends

- Evolution – Pan Rate

- Archive List

- Media, Maximums, Minimums

- Tag Info

Displays Navigator

Displays Navigator

Added Values

- ## PI ACE

  - Formula Library, Calls to external Programs, Flow Compensation

- ## PI OSIOPC Server

  - Direct retrieve/write data from Advanced Control Applications

- ## PI APS

  - Easy Points creation from DCS

- ## SIGMAFINE

  - Production Units Mass and Energy Balances

Conclusions

- PI **@** Repsol YPF Refineries

  - PI provides Plant data

  - PI constitute part of Production Management Systems

  - PI helps Laboratory information management

  - PI offers data for Production information management

  - PI Client tools allow engineers an easy daily job

    & and

  - PI Mission, Vision and Values do Return the Investment

THANK YOU

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▪ **Mission, Vision and Values** ▪