Turning **insight** into **action**.

OSIsoft. USERS CONFERENCE 2011

The Journey Toward Enterprise Value Creation in MOL Group Refining

Presented by **Tibor Komróczki**
MOL Group

“Coming together is a beginning.

Keeping together is progress.

Working together is success.”

Henry Ford

Agenda

- History of Refinery Operational System in MOL
- OSIsoft portfolio
- Unified operational control
- PI System based solutions in MOL Group
- Future plans

About MOL

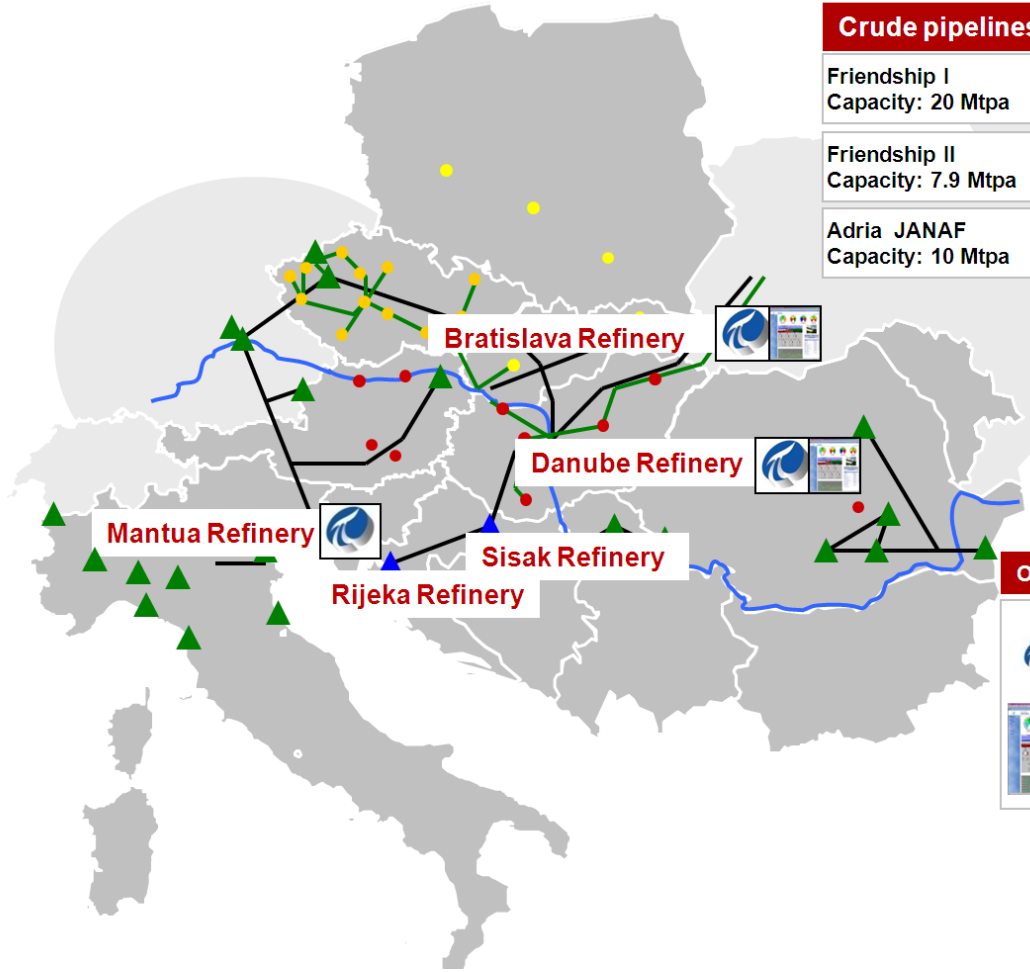
- Founded in 1991
- One of the largest multinational corporations in Central Europe
- 2009 Net sales revenue: ~ 15,94 mn. USD
- 2009 Market capitalization: ~ 9,4 Bn. USD
- Approximately 34,000 employees

Exploration & Production

- Activities in 9 countries (excluding INA blocks)
- 11 international exploration assets

Refining & Marketing

- 7 refineries in 4 countries (Hungary, Slovakia, Italy, Croatia)
- Extensive crude and product pipeline system
- 1686 filling stations in 10 countries



Crude pipelines

Friendship I
Capacity: 20 Mtpa

Friendship II
Capacity: 7.9 Mtpa

Adria JANAF
Capacity: 10 Mtpa

Refineries

DUNA
Capacity: 8.1 Mtpa
NCI: 10.6

BRATISLAVA
Capacity: 6.1 Mtpa
NCI: 11.5

Mantua - IES
Capacity: 2.6 Mtpa
NCI: 8.4

RIJEKA
Capacity: 4.5 Mtpa
NCI: 5.8

SISAK
Capacity: 2.2 Mtpa
NCI: 6.1

OSISoft softwares

PI installation

PI WebParts

PI System implementation

- MOL (Hungary) PI System -1998;
- SLOVNAFT (Slovakia) PI System - 2006;
- IES (Italy) PI System – 2008;
- INA (Croatia) PI System – 2012;

OSIsoft portfolio in MOL Group

- PI System
- PI DataLink – Energy monitoring, small applications
- PI ProcessBook , PI WebParts – SPS based website
- PI SDK – for application development
- Complex solution – Operational KPI system

Pillars of operational control

Business challenge Solution Result / Benefits

Business Challenge

- Closing the gap between process control and business governance
- Providing real-time information for tighter control of operations
- Establishing a unified data model of Refining for all refineries in the group
- Overall monitoring of operations to fulfill strategic objectives

Solution

- Implemented PI System to collect process data from the field regardless supplier of process control system
- Developed applications to support refinery functions via using PI System tools (PI SDK, PI DataLink, etc)
- Building PI Asset Framework and Group level data model
- Provides portal to publish reports, graphical information for all authenticated users

Results / Benefits

- Visible and controllable operations throughout the refineries
- Better situational awareness,stronger focus on corrective actions at all levels
- Users quickly find relevant information
- Closer to planned operations, scheduled activities, events

Unified system cornerstones

Data

Method

Software

Architecture

Hardware

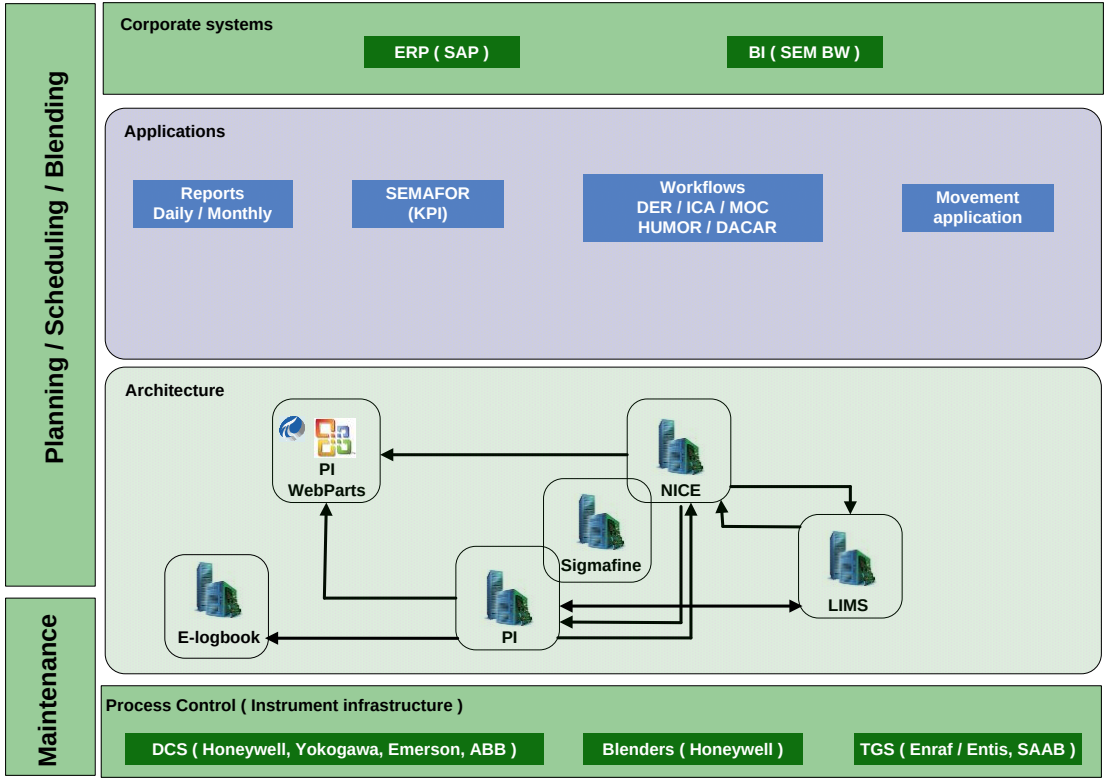
Strategy

Refinery Information System expectations

- Corporate-wide application and reporting system
- Support integrated and local business processes
- Multilingual environment
- **All based on PI System and applications**

Building the same data model everywhere

- Instrumentation
- Equipment model
- Framework
- Asset model



Results of the project

- Common reports
- Integrated operation
- Group level processing
- Common support

MOL applications

PI DataLink solutions

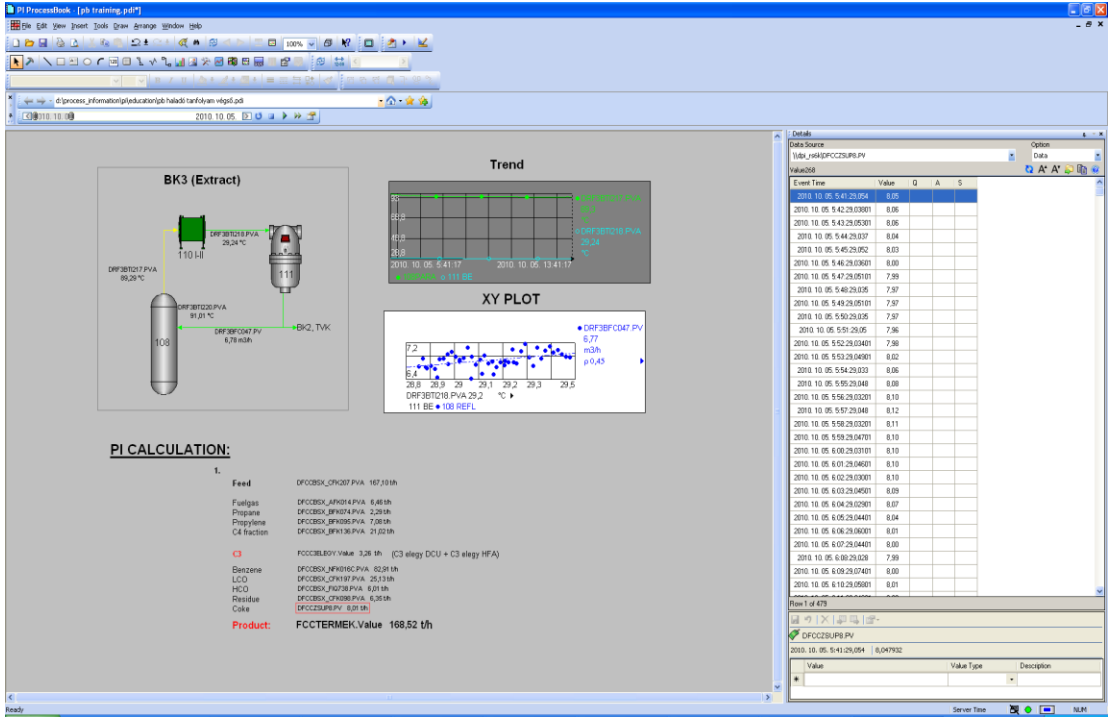
- Energy monitoring
- Technological card checking
- Ad-hoc reports

MIH Technological card

Description	Tag name	EU	Specification	Actual value
Feed processing	EFC308	t/h	max. 4,5	1.8
Quantity of H2	EFC106	Nm3/h	max. 3000	1197
Pressure from compressor No. 321/1-2	HP012B	bar	max. 46*	36.7
Temperature of feed after No. 175	ET001	°C	min. 90	122
Inlet temperature to heater No. 171	ET002	°C	min. 150	138
Outlet temperature from heater No. 171	ETT110	°C	max. 350	241
Inlet pressure to reactor No. 172	EP202	bar	max. 45	36
Outlet pressure from reactor No. 172	EP204	bar	max. 41	36
Temperature of separator No. 173	ET016	°C	max. 260	112
Temperature of steaming out column No. 174/1	ET017	°C	max. 240	40
Pressure of steaming out column No. 174/1	PI 11204	bar	max. 0,8	
Quantity of inlet steam to steaming out column No. 174/1	FI 11307	kg/h	max. 250	
Temperature of the bottom of vaccum dryer no. 174/2	TR 11107	°C	max. 230	
Pressure of vaccum dryer No. 174/2	PR 11210	mbar	10-250	
Temperature of the product after cooler No. 178	TR 11108	°C	max. 130	

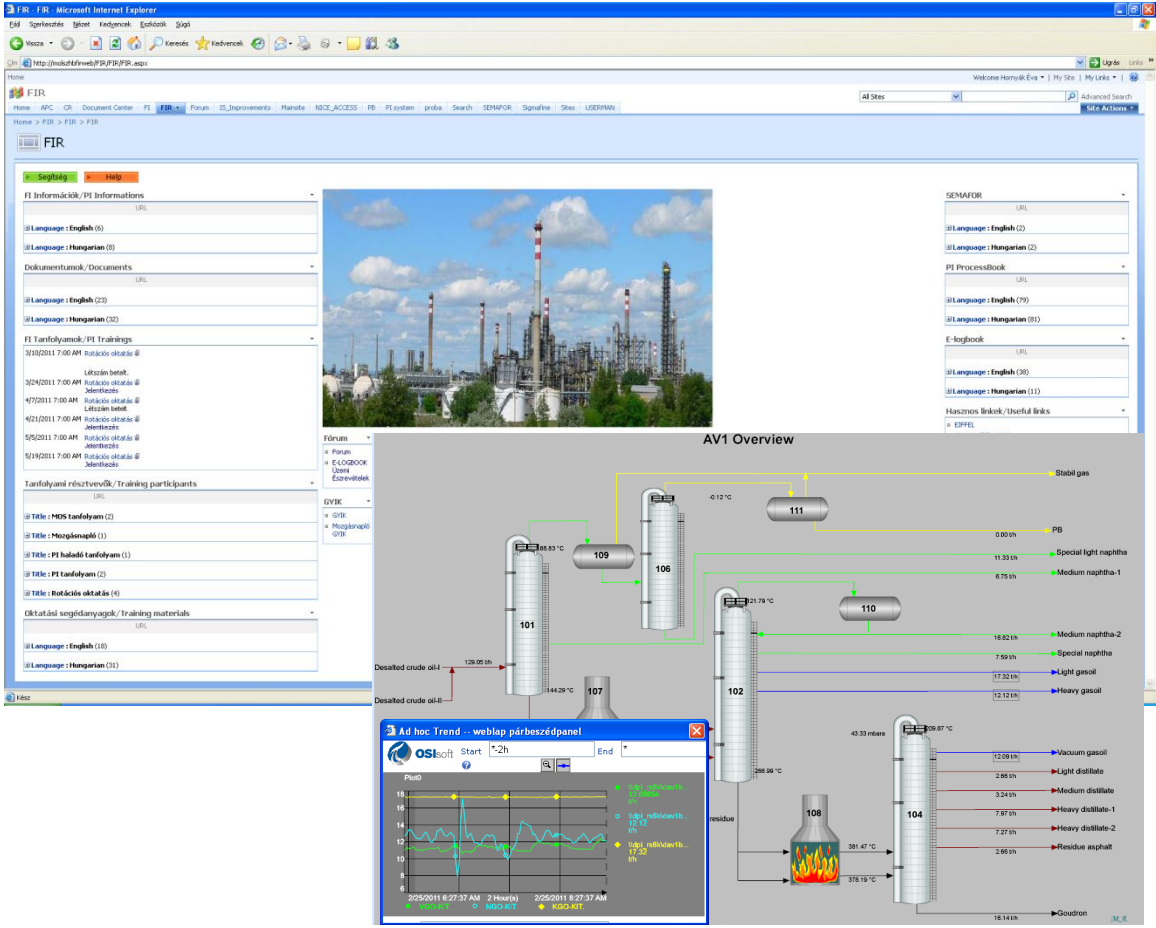
PI ProcessBook

- Graphical displays for PI WebParts
- Present relevant information and historical data
- Compare and check PI Tag values
- Create calculations



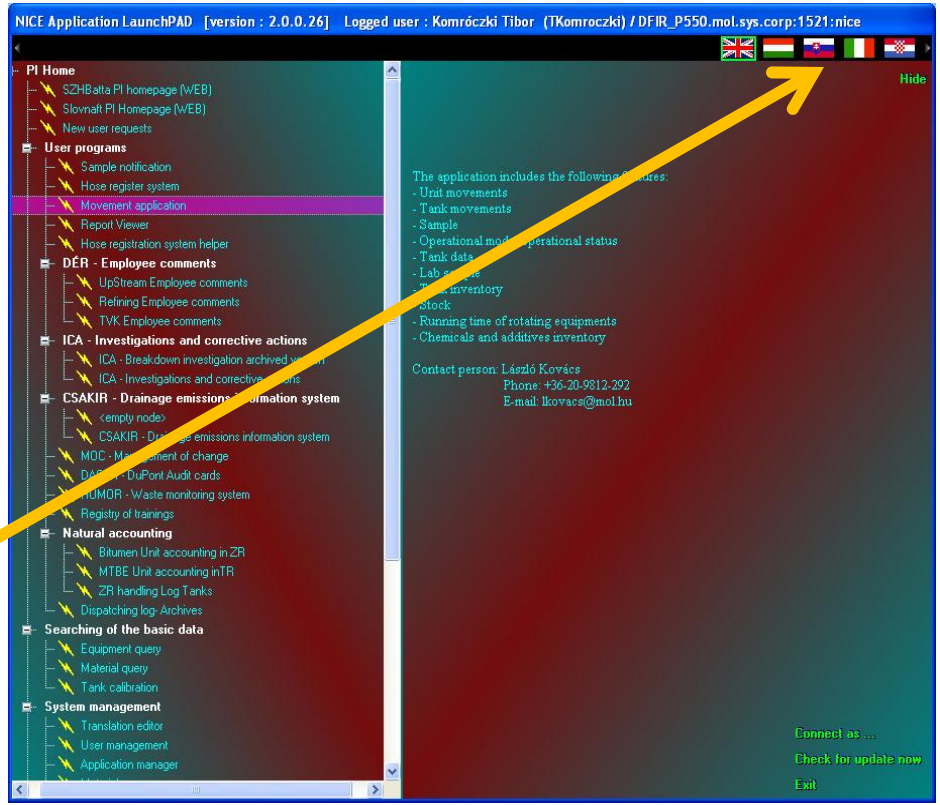
PI WebParts

- Upload ProcessBook flow sheets
- Organize training
- Share important information and documentations



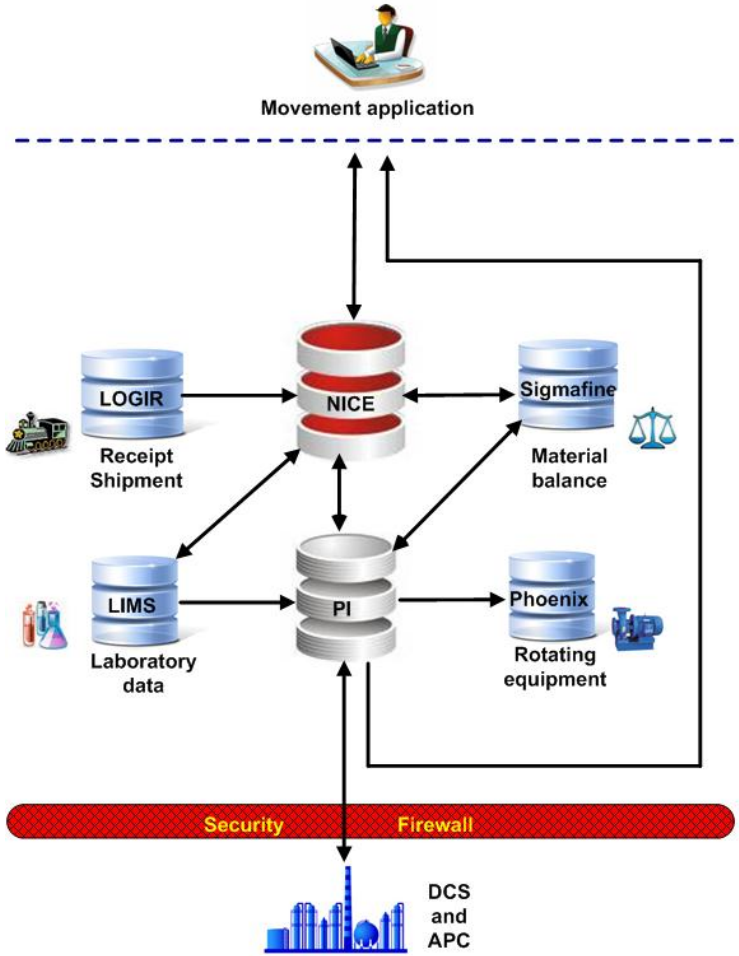
NICE applications

- PI SDK based application
- Centralized, structured
- Individual role levels
- Automatic version handling
- Used by everyone
- Multilanguage

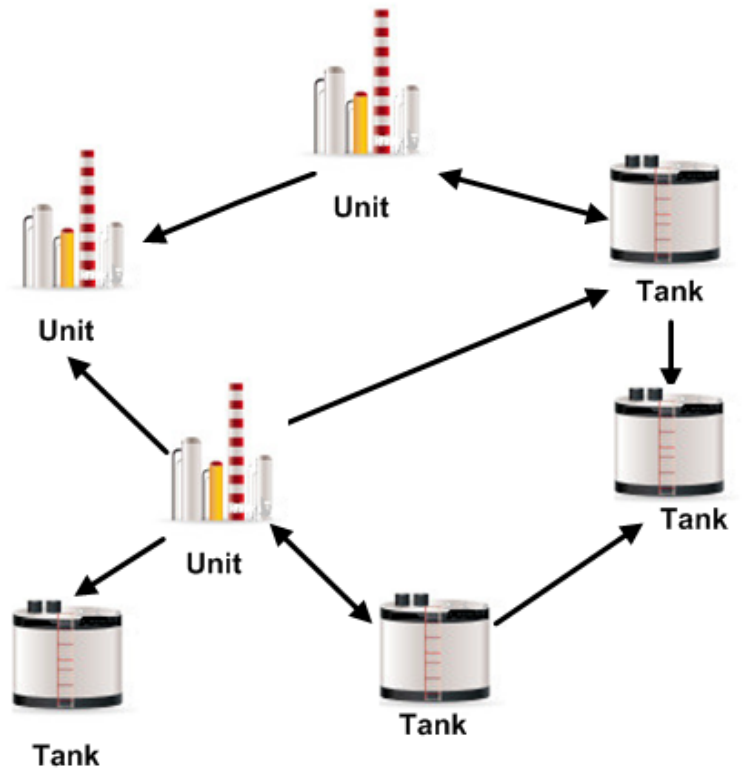


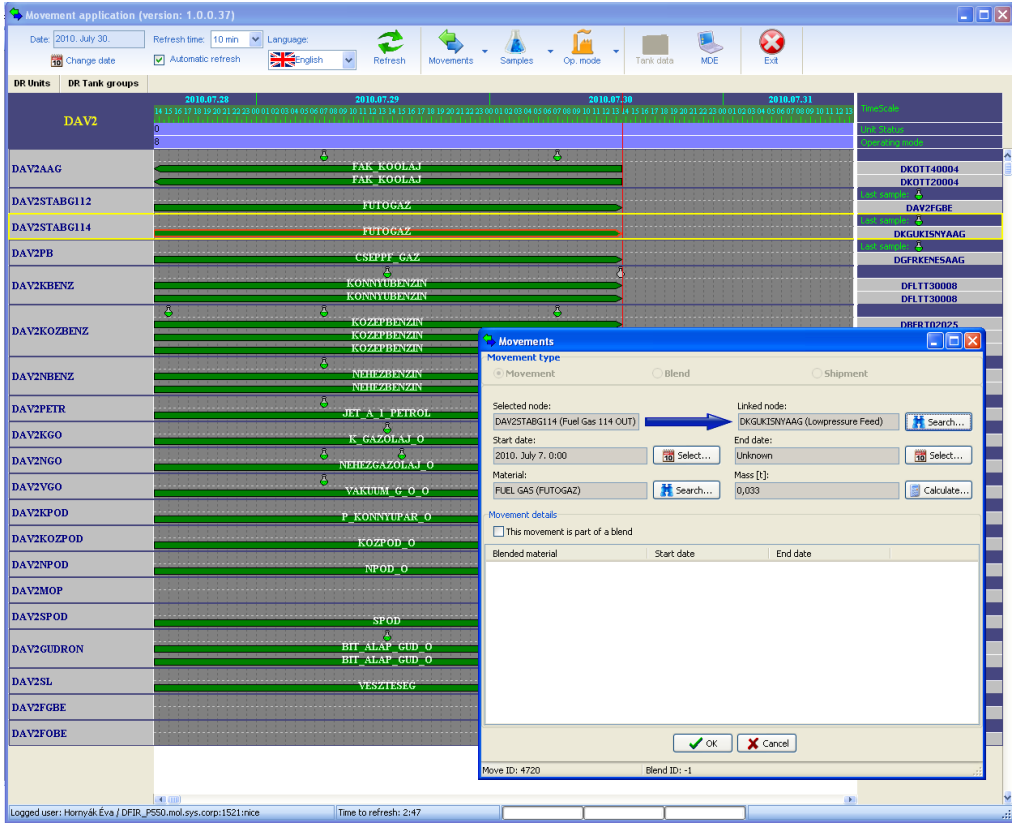
Movement application

- PI SDK based application
- Follow movements (unit and tank)
- Sample information
- Inventory
- Chemicals
- Rotating equipments



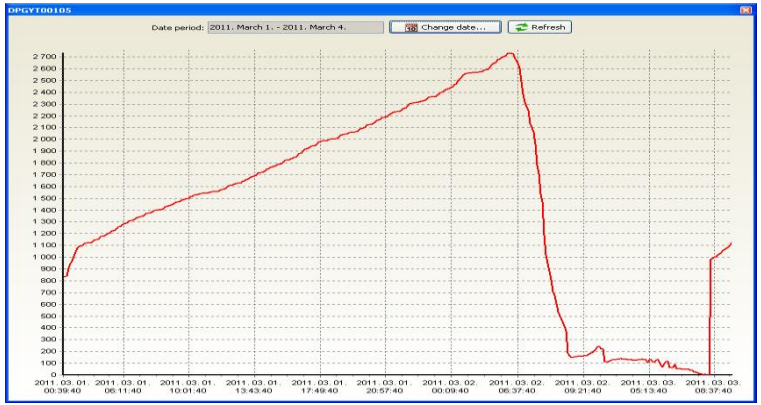
Movement application

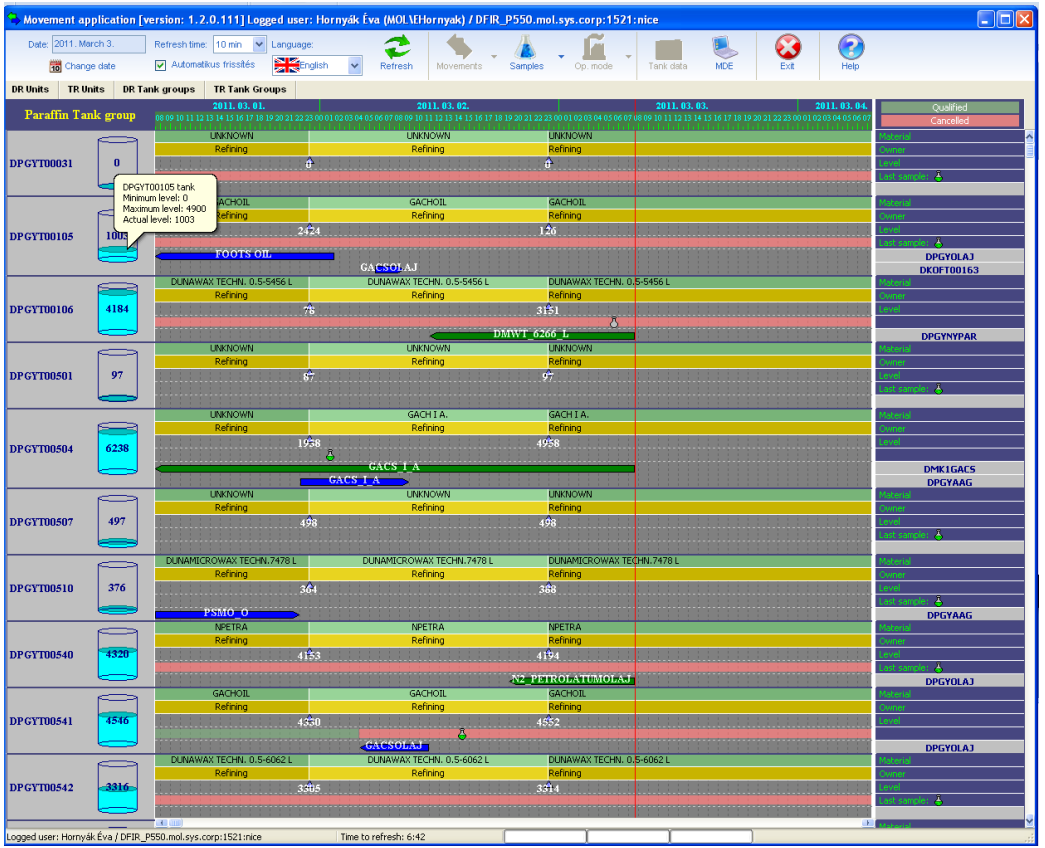




Tank movements

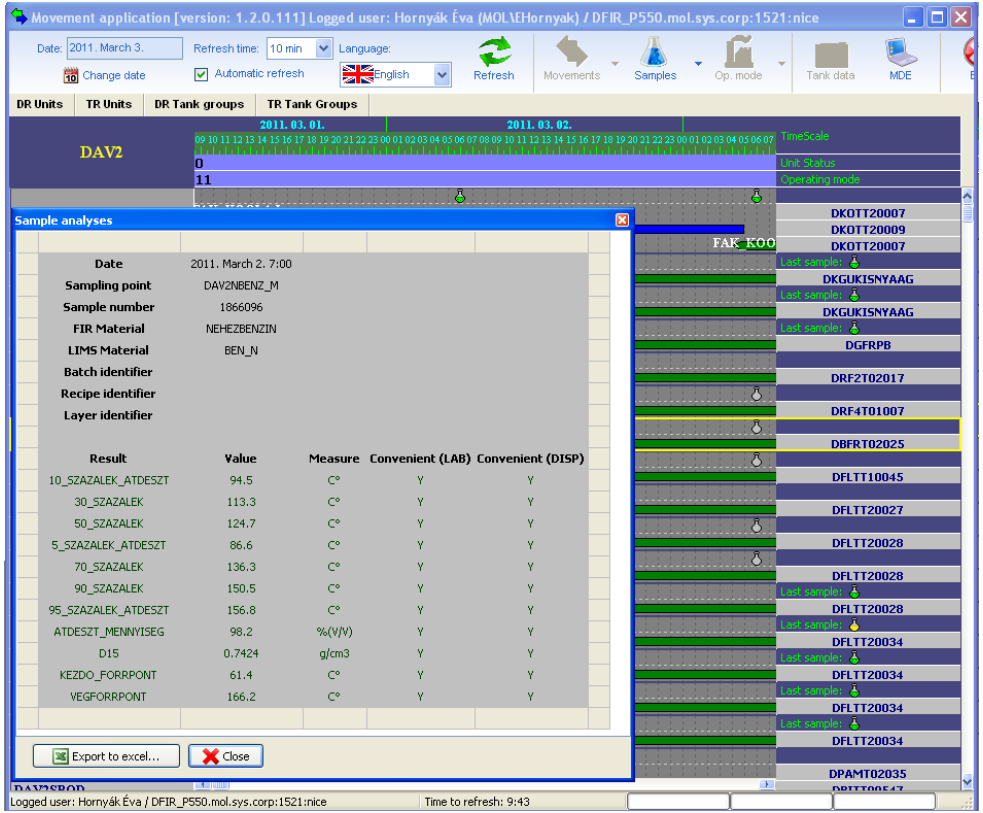
- Tank movements history
- Tank level data
- Sample information

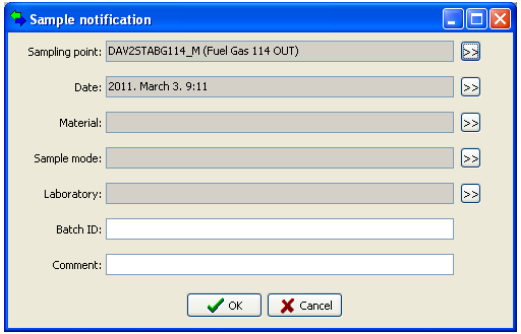




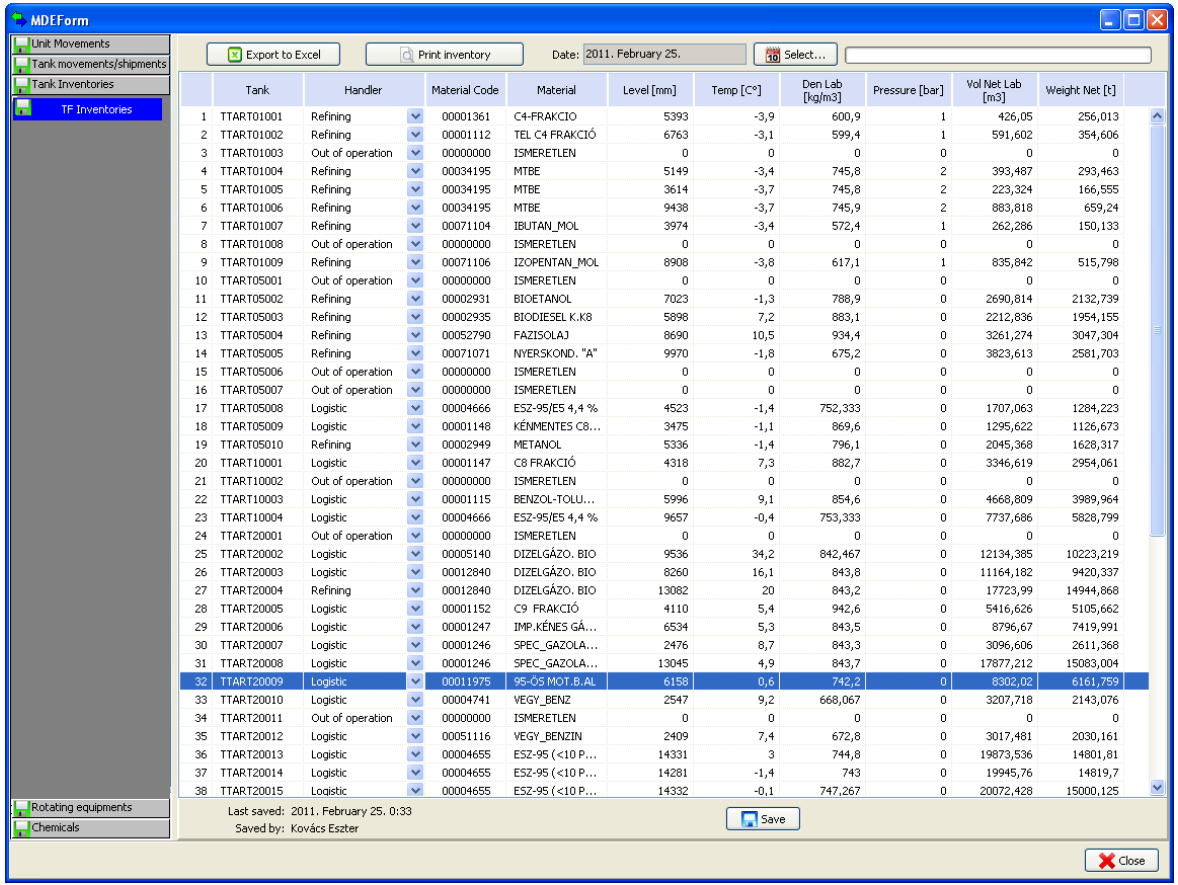
Sample information

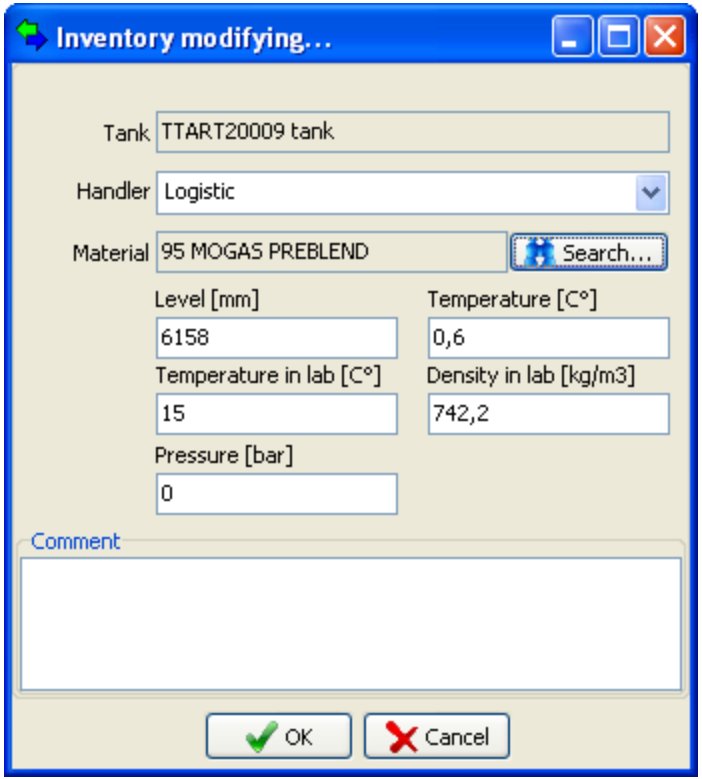
- Connection with LIMS and PI System
- Users can log-in samples easily
- Detailed sample result information





Inventory data

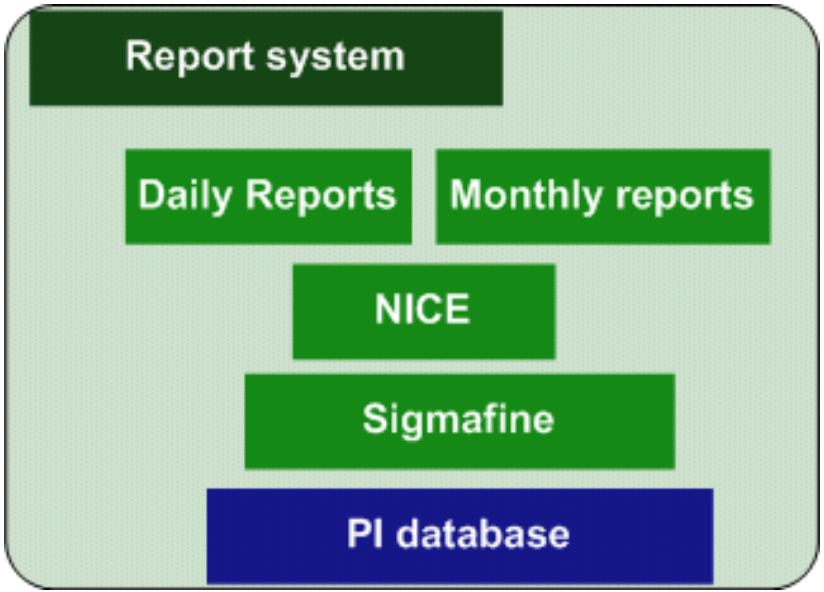


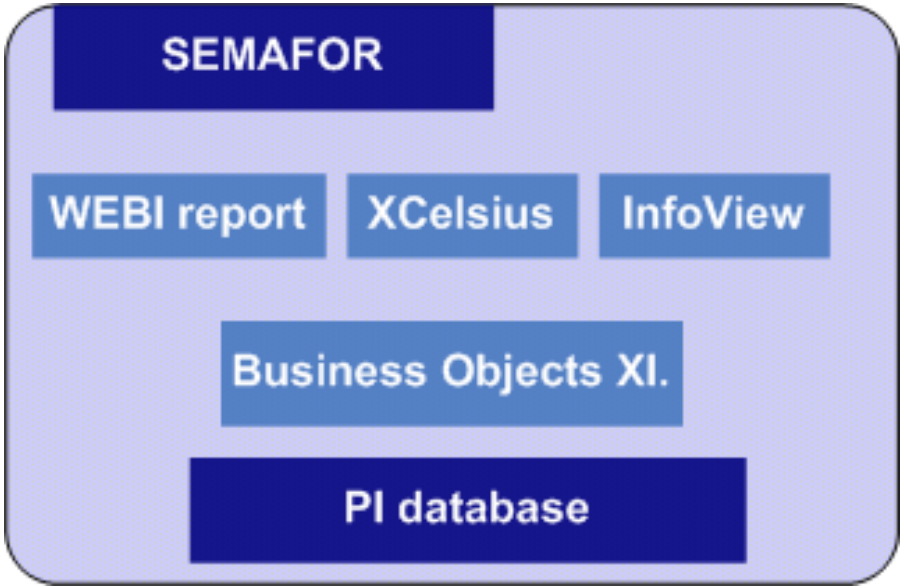


Some other applications

- PI SDK based applications
- Reporting system
- Operational KPI system – SEMAFOR
- APC monitoring
- Analyzer Reliability and Graphical User System - ARGUS
- Investigation and corrective actions
- DuPont Audit Card

Reporting system





Report system

- Unify the stream of information
- Helps to recognize anomalies
- Bridge between the different data

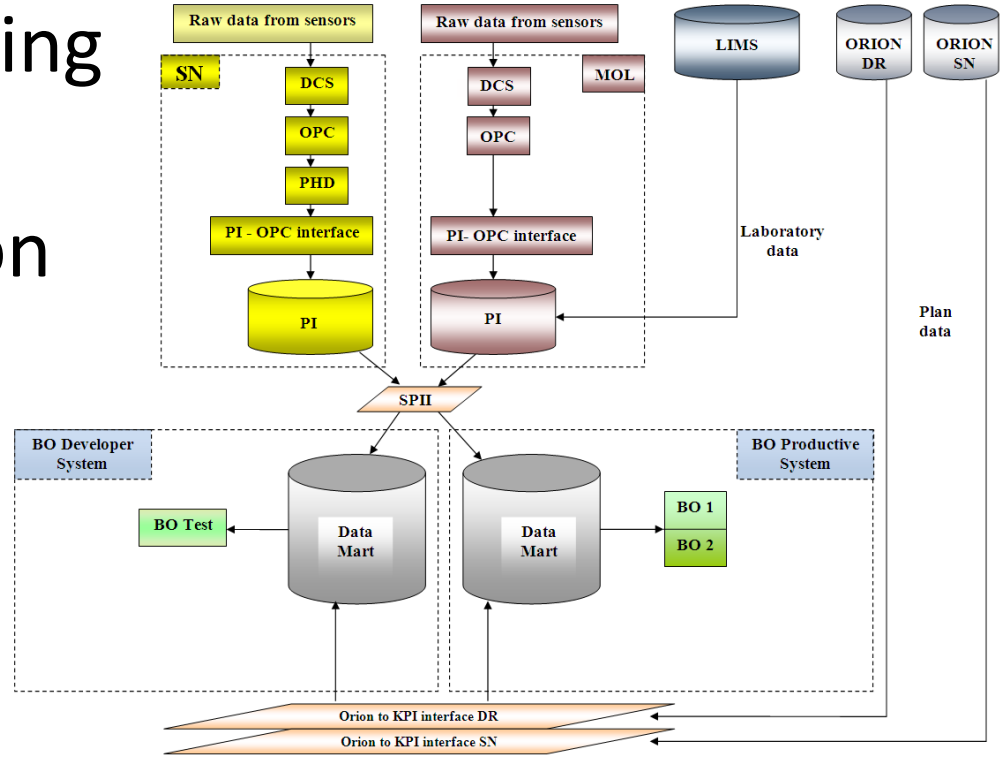
Inventory

Mir ID: PROD_1_REF4.9_MOL1/DNK/03
Place: Danube Refinery
Date: 2011.02.10.

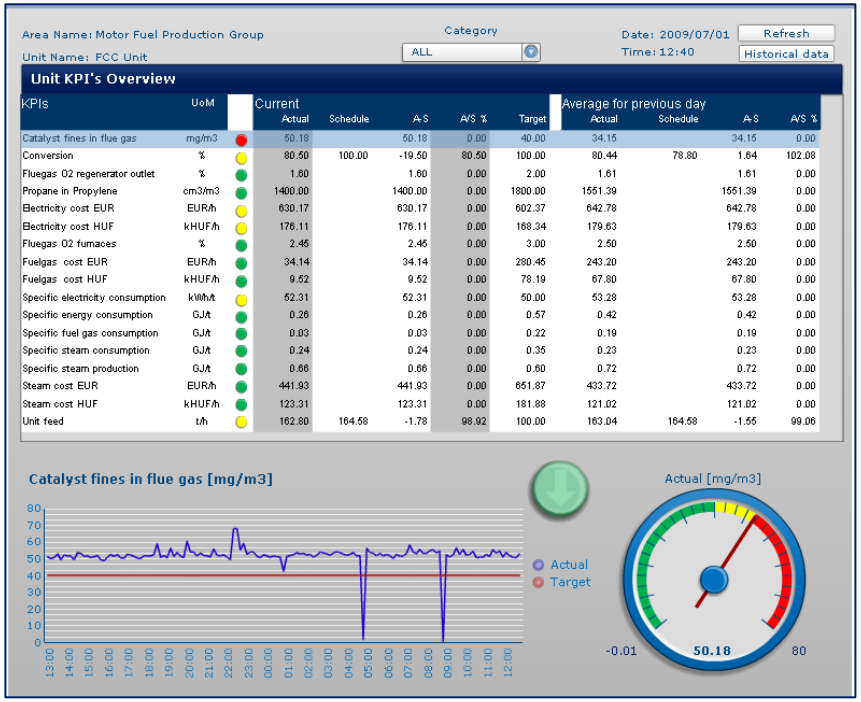
	Inventory	Storage	Delta	UoM
Summary				
FEEDS	338980,77	299633,102	-2103,154	t
PRODUCTS	330688,99	333040,877	2649,541	t
OUTSIDER INVENTORIES	261486,84	1730,731	5,278	t
Inside inventories	669669,76	632673,979	546,387	t
Sum CH inventory	931156,6	634404,71	551,665	t
Groups				
1.) Crude oils				
- REB crude	155625,01	63756,298	-5273,141	t
- Raw Condensate	0	0	0	t
- Algyo (H) crude	45183,104	12585,709	1618,906	t
- Paraffinic hungarian crudes	0	0	0	t
- Sulphur hungarian crude	0	0	0	t
- Miscellaneous hungarian crudes	7294,833	6980,587	327,503	t
- Miscellaneous import crudes	0	0	0	t
Crude oils:	208102,95	83322,594	-3326,732	t
2.) Processed with crude oil				
- Slop	102,812	307,683	0,98	t
- Phaseoil	0	0	0	t
- AtmResid	0	0	0	t
- Spent oil	0	0	0	t
Processed with crude oil:	102,812	307,683	0,98	t

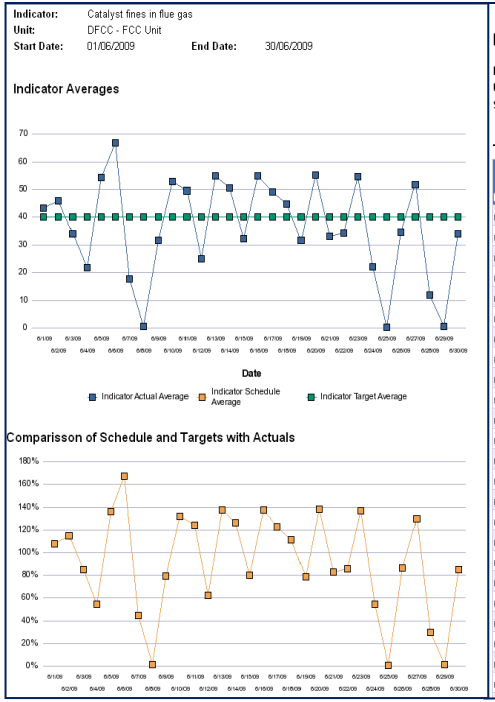
Operational KPI system - SEMAFOR

- Daily operation monitoring through KPIs
- Consolidated information and reporting system
- Increase performance transparency



Operational KPI system





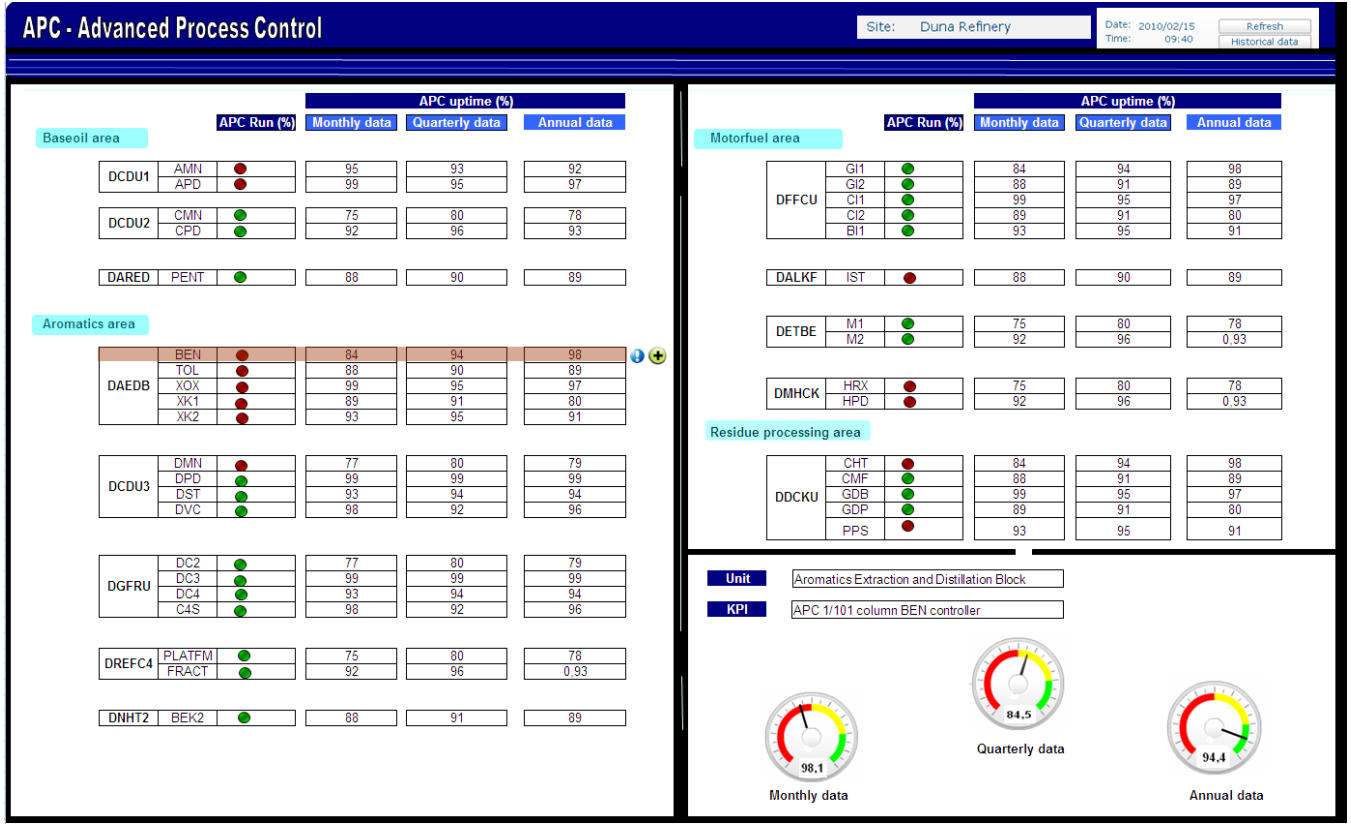
Historical Data Report

Indicator: Catalyst fines in flue gas
Unit: DFCC - FCC Unit
Start Date: 01/06/2009 **End Date:** 30/06/2009

Table with Data Details

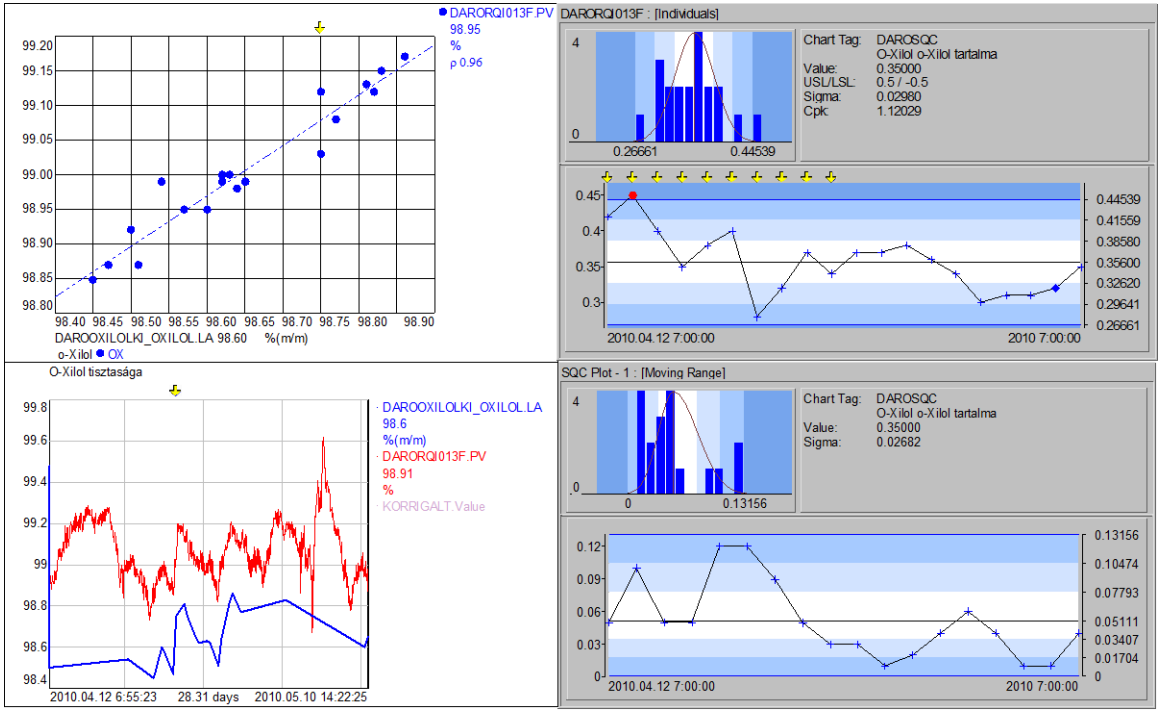
Date	Indicator Actual Average	Indicator Schedule Average	Actual vs. Schedule	Indicator Target Average	Actual vs. Target
6/1/09	43.22			40.00	108.05%
6/2/09	46.05			40.00	115.13%
6/3/09	34.04			40.00	85.11%
6/4/09	21.84			40.00	54.61%
6/5/09	54.38			40.00	135.96%
6/6/09	66.95			40.00	167.37%
6/7/09	17.81			40.00	44.52%
6/8/09	0.62			40.00	1.55%
6/9/09	31.73			40.00	79.32%
6/10/09	52.80			40.00	132.01%
6/11/09	49.57			40.00	123.93%
6/12/09	24.99			40.00	62.46%
6/13/09	55.08			40.00	137.70%
6/14/09	50.49			40.00	126.22%
6/15/09	32.18			40.00	80.44%
6/16/09	55.05			40.00	137.63%
6/17/09	49.07			40.00	122.67%
6/18/09	44.67			40.00	111.66%
6/19/09	31.61			40.00	79.02%
6/20/09	55.35			40.00	138.37%
6/21/09	33.27			40.00	83.17%
6/22/09	34.41			40.00	86.03%
6/23/09	54.69			40.00	136.73%
6/24/09	21.97			40.00	54.93%

Advanced Process Control monitoring



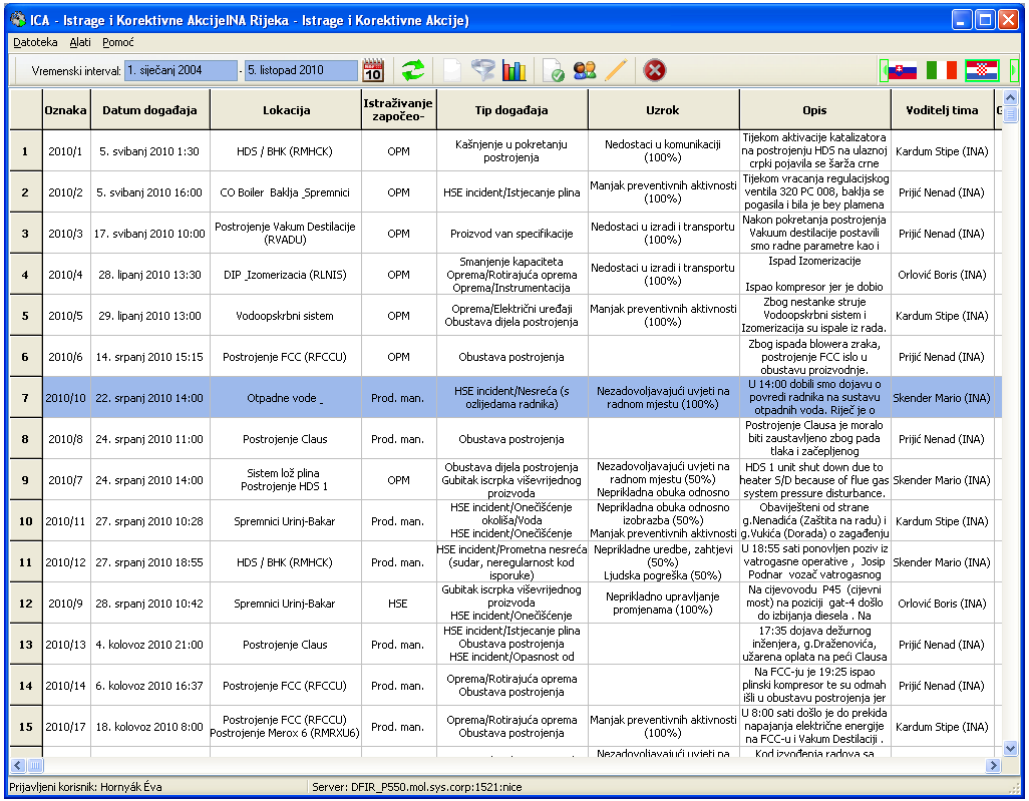
Analyzer Reliability and Graphical User System

- Continuous validation of process analyzers
- Western electric patterns
- Common platform for laboratory and process data



Investigation and corrective actions

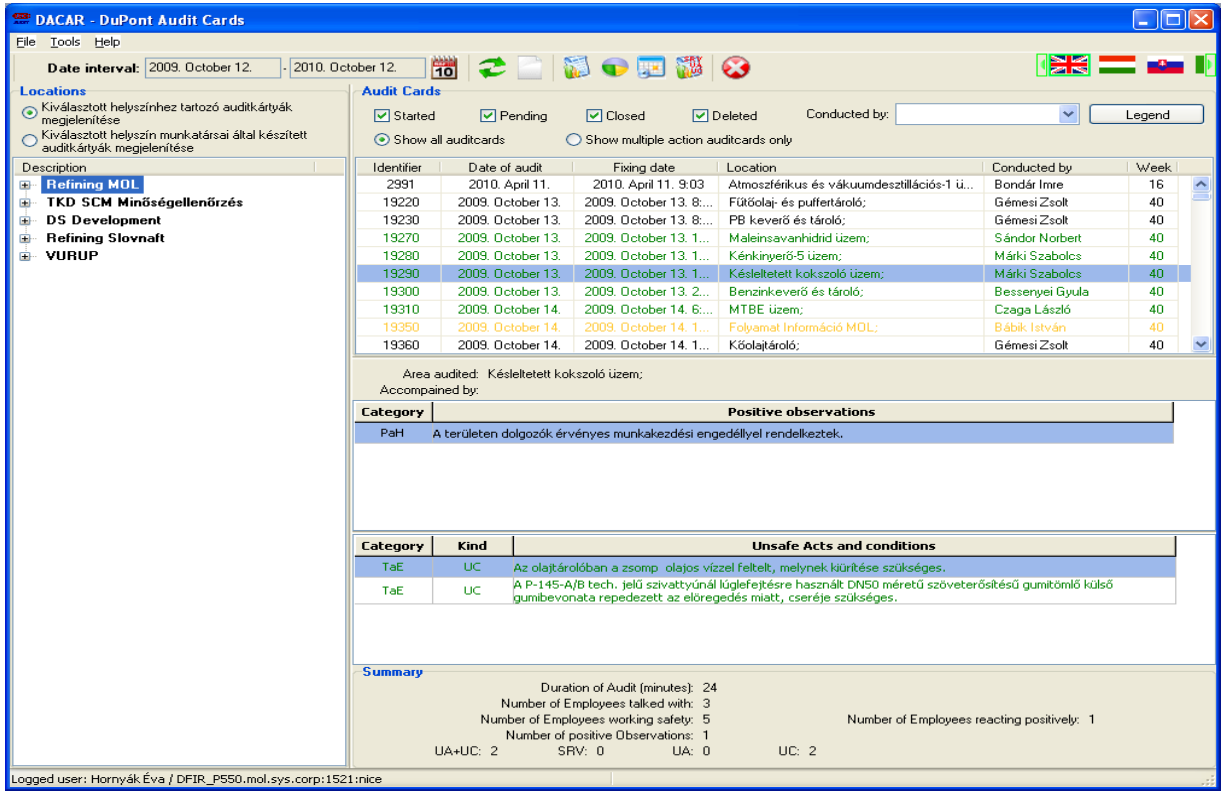
- Quick and easy investigation process
- Statistical analysis
- Historical data
- Decrease the number of unit shut-downs



	Oznaka	Datum događaja	Lokacija	Istraživanje započeo-	Tip događaja	Uzrok	Opis	Voditelj tima
1	2010/1	5. svibanj 2010 1:30	HDS / BHK (RMHCK)	OPM	Kašnjenje u pokretanju postrojenja	Nedostaci u komunikaciji (100%)	Tijekom aktivacije katalizatora na postrojenju HDS na ulaznoj crpki pojavila se šarža crne	Kardum Stipe (INA)
2	2010/2	5. svibanj 2010 16:00	CO Boiler Baklja _Spremnici	OPM	HSE incident/Istjecanje plina	Manjak preventivnih aktivnosti (100%)	Tijekom vracanja regulacijskog ventila 320 PC 008, baklja se pogasila i bila je bey plamena	Prijić Nenad (INA)
3	2010/3	17. svibanj 2010 10:00	Postrojenje Vakum Destilacije (RVADU)	OPM	Proizvod van specifikacije	Nedostaci u izradi i transportu (100%)	Nakon pokretanja postrojenja Vakuum destilacije postavili smo radne parametre kao i	Prijić Nenad (INA)
4	2010/4	28. lipanj 2010 13:30	DIP _Izomerizacia (RLNIS)	OPM	Smanjenje kapaciteta Oprema/Rotirajuća oprema Oprema/Instrumentacija	Nedostaci u izradi i transportu (100%)	Ispad Izomerizacije Ispao kompresor jer je dobio	Orlović Boris (INA)
5	2010/5	29. lipanj 2010 13:00	Vodoopskrbni sistem	OPM	Oprema/Električni uređaji Obustava dijela postrojenja	Manjak preventivnih aktivnosti (100%)	Zbog nestanke struje Vodoopskrbni sistem i Izomerizacija su ispale iz rada.	Kardum Stipe (INA)
6	2010/6	14. srpanj 2010 15:15	Postrojenje FCC (RFCCU)	OPM	Obustava postrojenja		Zbog ispada blowera zraka, postrojenje FCC islo u obustavu proizvodnje.	Prijić Nenad (INA)
7	2010/10	22. srpanj 2010 14:00	Otpadne vode _	Prod. man.	HSE incident/Nesreća (s ozljedama radnika)	Nezadovoljavajući uvjeti na radnom mjestu (100%)	U 14:00 dobili smo dojavu o povredi radnika na sustavu otpadnih voda. Riječ je o	Skender Mario (INA)
8	2010/8	24. srpanj 2010 11:00	Postrojenje Claus	Prod. man.	Obustava postrojenja		Postrojenje Clausa je moralo biti zaustavljeno zbog pada tlaka i začepljenog	Prijić Nenad (INA)
9	2010/7	24. srpanj 2010 14:00	Sistem lož plina Postrojenje HDS 1	OPM	Obustava dijela postrojenja Gubitak iscrpka viševrijednog proizvoda	Nezadovoljavajući uvjeti na radnom mjestu (50%) Neprikladna obuka odnosno	HDS 1 unit shut down due to heater S/D because of flue gas system pressure disturbance.	Skender Mario (INA)
10	2010/11	27. srpanj 2010 10:28	Spremnici Urinj-Bakar	Prod. man.	HSE incident/Onečišćenje okoliša/Voda HSE incident/Onečišćenje	Neprikladna obuka odnosno izobrazba (50%) Manjak preventivnih aktivnosti	Obaviješteni od strane g.Nenadića (Zaštita na radu) i g.Vukića (Dorada) o zagađenju	Kardum Stipe (INA)
11	2010/12	27. srpanj 2010 18:55	HDS / BHK (RMHCK)	Prod. man.	HSE incident/Prometna nesreća (sudar, neregularnost kod isporuke)	Neprikladne uredbe, zahtjevi (50%) Ljudska pogreška (50%)	U 18:55 sati ponovljen poziv iz vatrogasne operative , Josip Podnar vozač vatrogasnog	Skender Mario (INA)
12	2010/9	28. srpanj 2010 10:42	Spremnici Urinj-Bakar	HSE	Gubitak iscrpka viševrijednog proizvoda HSE incident/Onečišćenje	Neprikladno upravljanje promjenama (100%)	Na cijevovodu P45 (cijevni most) na poziciji gat-4 došlo do izbijanja diesela . Na	Orlović Boris (INA)
13	2010/13	4. kolovoz 2010 21:00	Postrojenje Claus	Prod. man.	HSE incident/Istjecanje plina Obustava postrojenja HSE incident/Opasnost od		17:35 dojava dežurnog inženjera, g.Draženovića, užarena oplata na peći Clausa	Prijić Nenad (INA)
14	2010/14	6. kolovoz 2010 16:37	Postrojenje FCC (RFCCU)	Prod. man.	Oprema/Rotirajuća oprema Obustava postrojenja		Na FCC-ju je 19:25 ispao plinski kompresor te su odmah išli u obustavu postrojenja jer	Prijić Nenad (INA)
15	2010/17	18. kolovoz 2010 8:00	Postrojenje FCC (RFCCU) Postrojenje Merox 6 (RMRXU6)	Prod. man.	Oprema/Rotirajuća oprema Obustava postrojenja	Manjak preventivnih aktivnosti (100%)	U 8:00 sati došlo je do prekida napajanja električne energije na FCC-u i Vakum Destilaciji .	Kardum Stipe (INA)

DuPont Audit Cards

- PI SDK based application
- Helps to handle the audit cards
- Report function
- Select options
- Export to Excel



Future Plans and Next Steps

- Launch REFIS master program
- Enterprise agreement feasibility
- Group level knowledge sharing
- Group level PI System expert team (COE)
- New project ideas

Questions

- Contact information

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Thank you

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