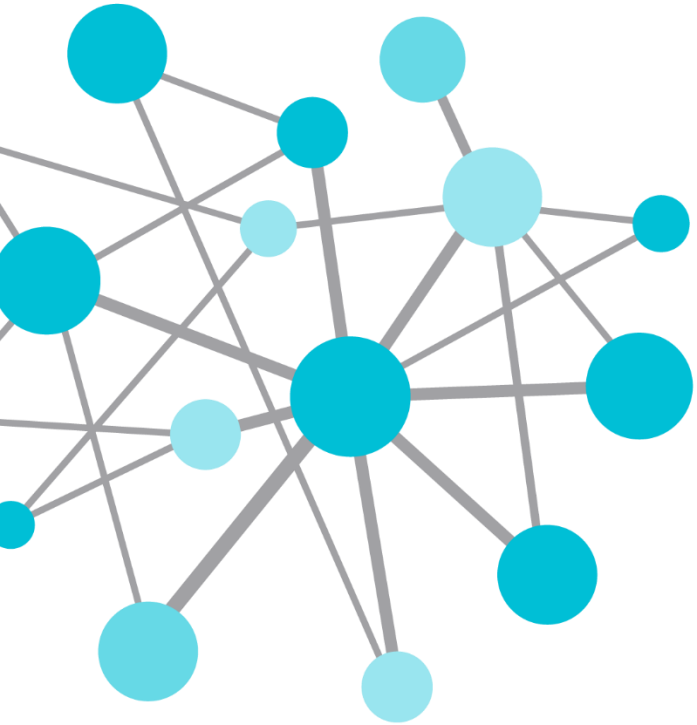


Increasing Efficiency and Process Safety with PI Notifications in MOL

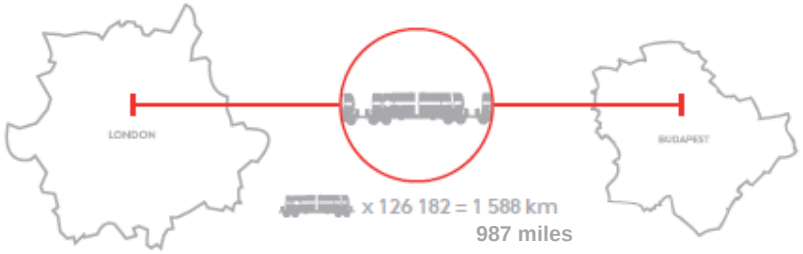
Presented by **Tibor Komróczki**

Agenda

- MOL Group in numbers
- PI System portfolio of MOL Plc.
- Interlocks
- E-Flare
- Technological card
- Analyzer reliability

MOL Group in numbers

50 million barrels
of oil-equivalent hydrocarbons
produced annually



FORTUNE GLOBAL 500

- [410] McDONALD'S
- [411] DANONE
- [412] MOL
- [445] BRITISH AMERICAN TOBACCO
- [467] HEINEKEN

1 million
retail customer transactions/day.
Every year, we serve the equivalent
of the entire population
of South America.

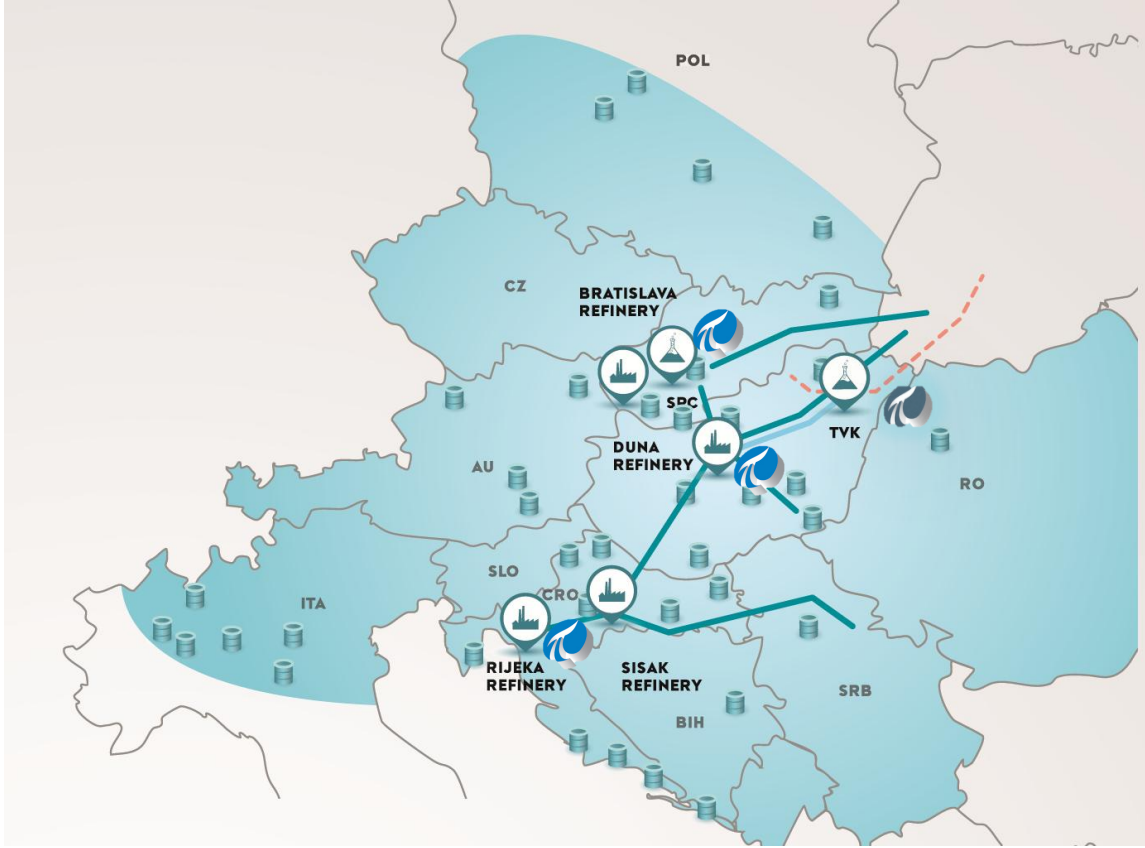
32 000 employees
employed worldwide

could be seated on
145 Boeing 787 Dreamliners.

x 1000

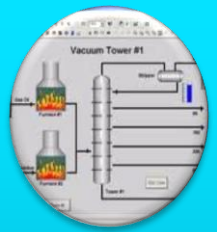
MOL Group Downstream

- 6 production units
- 23.5 mtpa refining capacity
- 2.1 mtpa petrochemicals capacity
- >1,900 filling stations
- under 8 brands in 11 CEE
- **370 000 PI Tag capacity**



PI SYSTEM & MOL

PI System portfolio of MOL PLc.2014

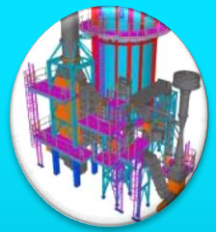


PI Clients

Publish data via
PI ProcessBook
PI DataLink
PI Coresight
PI WebParts

PI SDK
PI API

Developed applications to support refinery functions



PI Asset Framework

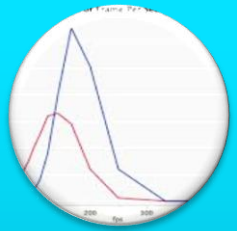
Collect data from the field and create unified asset hierarchy

PI Notifications

Alerting platform based upon the PI AF architecture

PI ACE

Write complex equations, which are reusable for similar data sets



PI Event Frames

Shifts
Operating Modes
Batches

Process Information and Automation at MOL

PI System Group

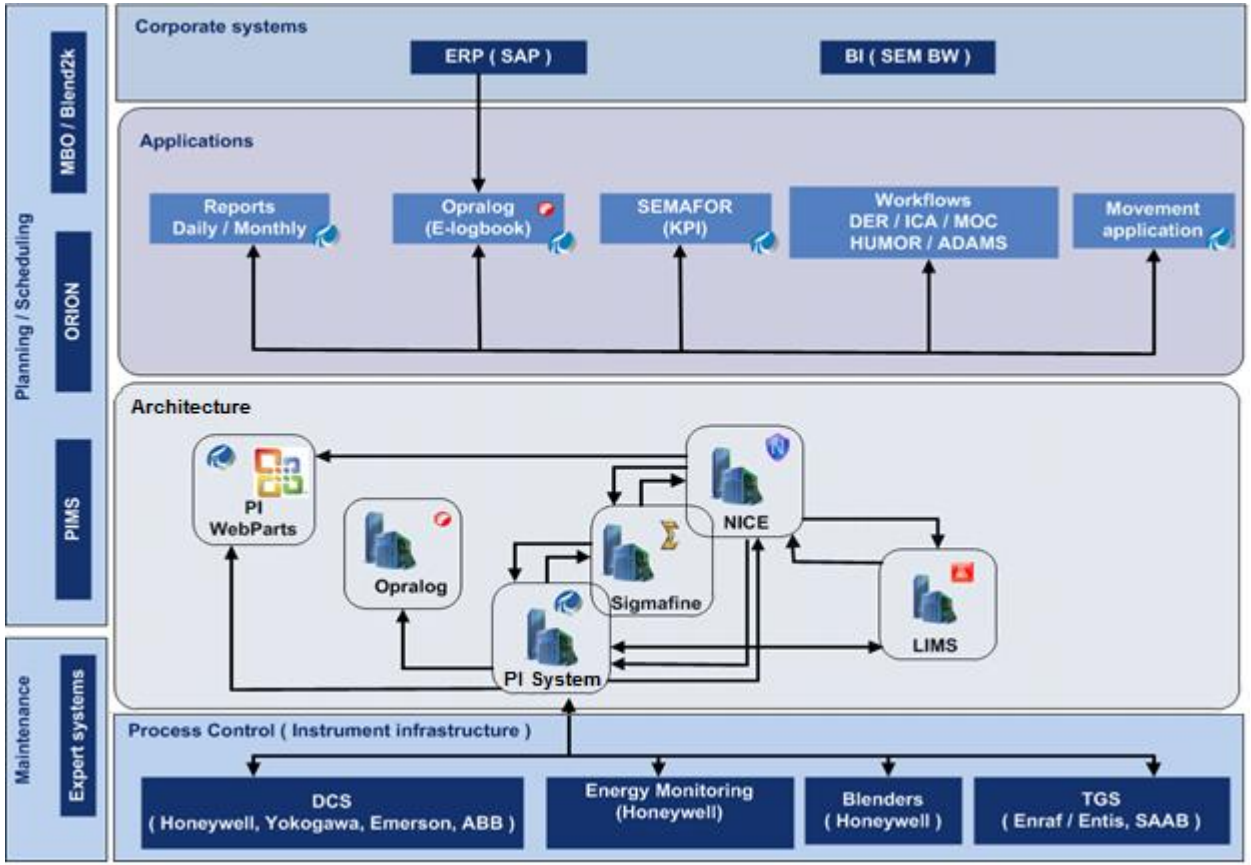
- System administration
- PI Asset Framework (PI AF) and PI Notifications development and support
- End user, client support
- PI System training for end users
  - PI Clients applications
  - PI AF

Other responsibilities

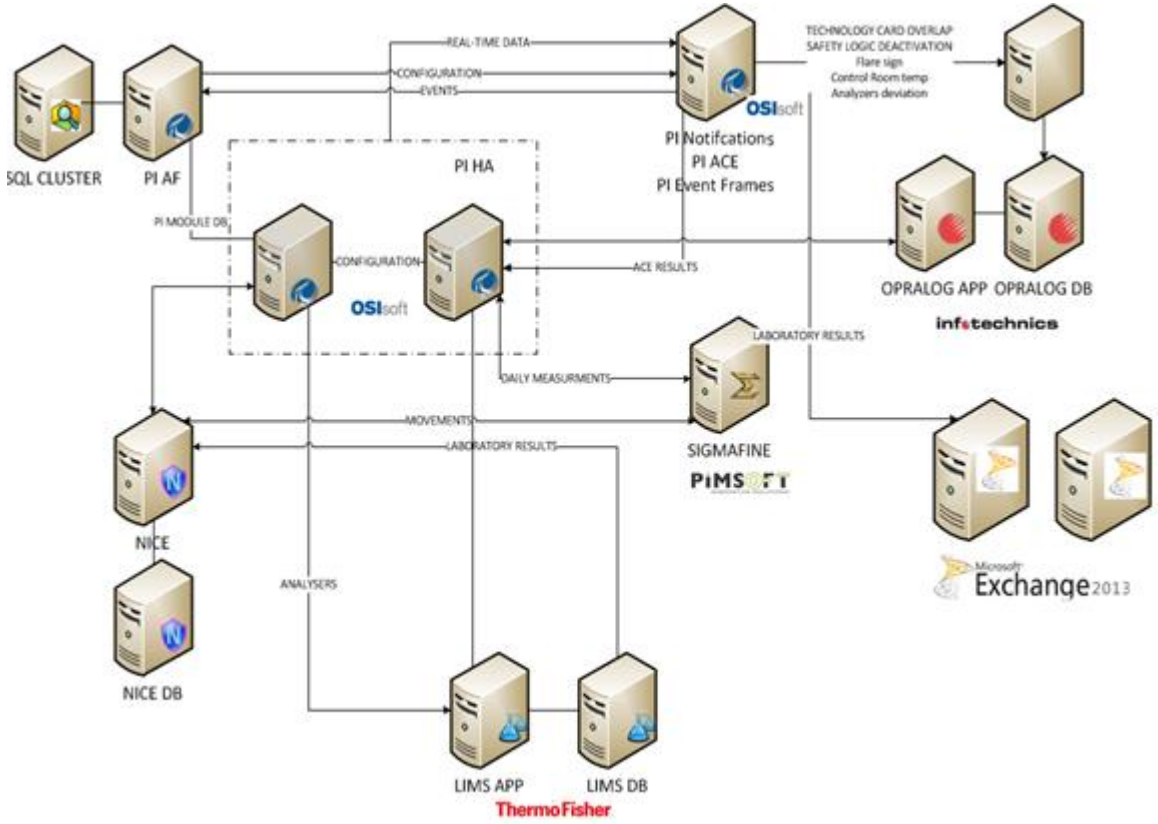
- Project development & support
- APC operation
- NICE system (in-house development) support
- Energy monitoring
- Alarm management
- KPI management (SEMAFOR)
- Industrial Network operation
- Loop monitoring
- Operator Training Simulator

15 FTE with Chemical- Electrical - and Computer knowledge

Framework



PI Notifications relationships



- Common server network
- Direct connection between systems
- Reporting of outages
- Statistical methods
- Continuous process monitoring

Controlling safety via PI System tools

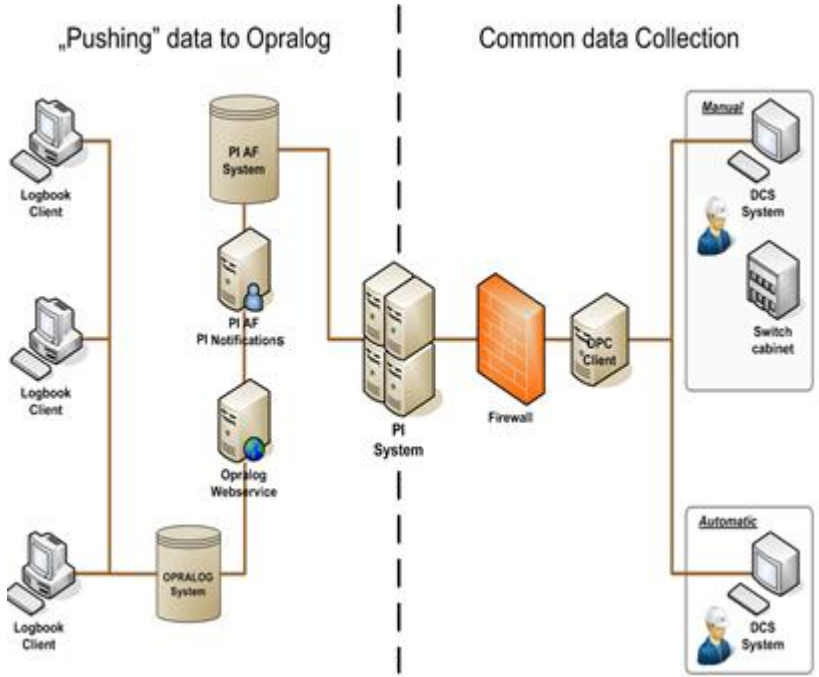
- On-line analyzers
- Interlock
- Flare

- Notifications
- Reports
- Displays

- Safe operation
- Reduced shut-downs
- Efficiency

INTERLOCKS

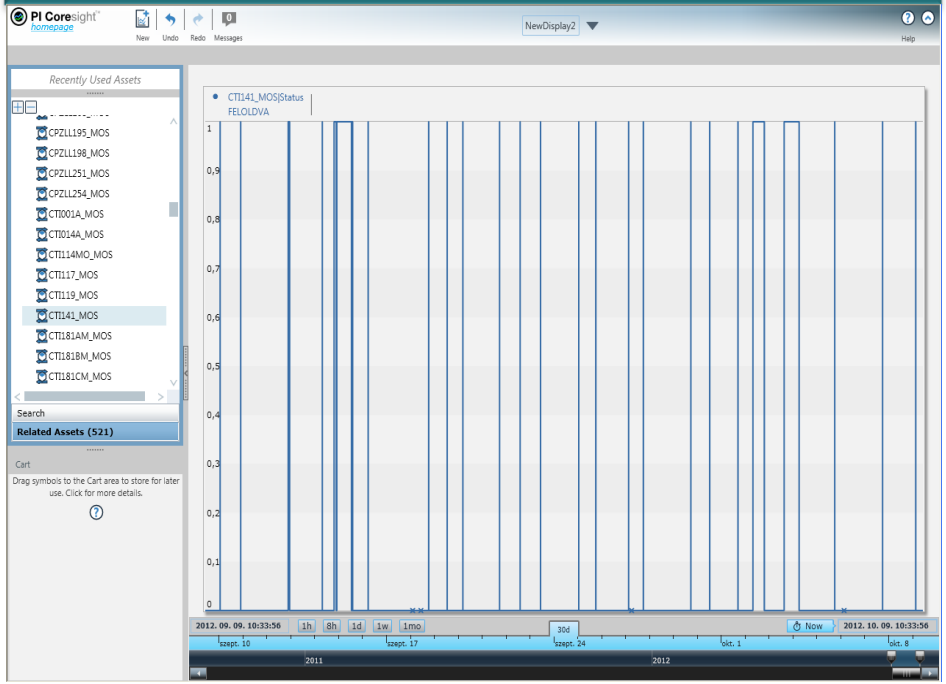
Interlock Logbook Migration into Opralog



- Information about the switch (name, description)
- Information about the status (new state, event time)
- Who turned on/off?
- Who permitted?
- What was the reason?

PI Coresight visualization

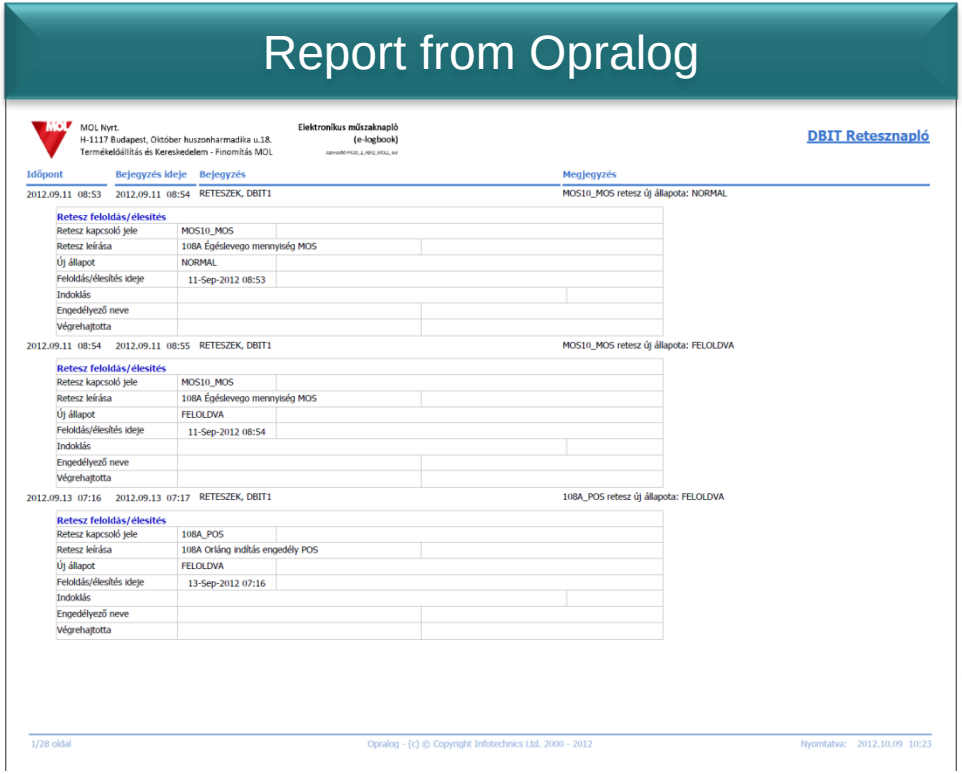
Report from PI System



- Actual status
- When the switch was turned off?
- How long the switch was turned off in the last 3 months?

Interlock logbook migration into Opralog

Report from Opralog



MOL Nyrt.
H-1117 Budapest, Október huszonharmadika u.18.
Termékelőállítás és Kereskedelem - Finomítás MOL

Elektronikus műszaknapló
(e-logbook)

DBIT Retesznapló

Időpont	Bejegyzés ideje	Bejegyzés	Megjegyzés
2012.09.11 08:53	2012.09.11 08:54	RETESZEK, DBIT1	MOS10_MOS retesz új állapota: NORMAL

Retesz feloldás/élesítés	
Retesz kapcsoló jele	MOS10_MOS
Retesz leírása	108A Égéslevego mennyiség MOS
Új állapot	NORMAL
Feloldás/élesítés ideje	11-Sep-2012 08:53
Indoklás	
Engedélyező neve	
Végrehajtotta	

Időpont	Bejegyzés ideje	Bejegyzés	Megjegyzés
2012.09.11 08:54	2012.09.11 08:55	RETESZEK, DBIT1	MOS10_MOS retesz új állapota: FELOLDVA

Retesz feloldás/élesítés	
Retesz kapcsoló jele	MOS10_MOS
Retesz leírása	108A Égéslevego mennyiség MOS
Új állapot	FELOLDVA
Feloldás/élesítés ideje	11-Sep-2012 08:54
Indoklás	
Engedélyező neve	
Végrehajtotta	

Időpont	Bejegyzés ideje	Bejegyzés	Megjegyzés
2012.09.13 07:16	2012.09.13 07:17	RETESZEK, DBIT1	108A_POS retesz új állapota: FELOLDVA

Retesz feloldás/élesítés	
Retesz kapcsoló jele	108A_POS
Retesz leírása	108A Orláng indítás engedély POS
Új állapot	FELOLDVA
Feloldás/élesítés ideje	13-Sep-2012 07:16
Indoklás	
Engedélyező neve	
Végrehajtotta	

1/28 oldal

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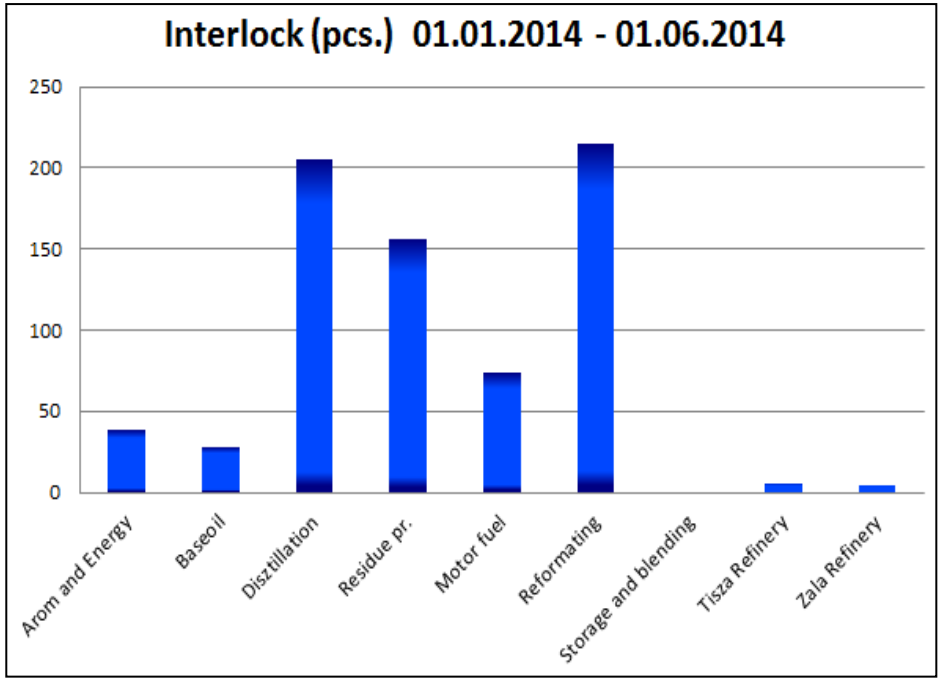
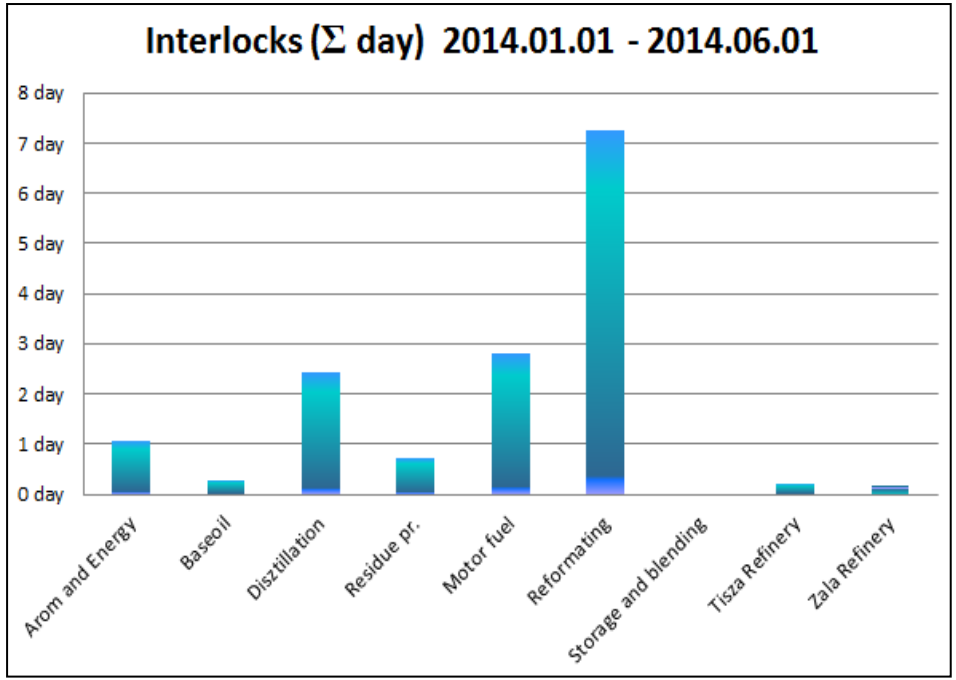
Nyomtatva: 2012.10.09 10:23

- Consequent, event based logging
- Information Sharing
- Support audits (PSM)
- Easier incident investigation
- Highlights problematic fields

PSM monitoring- switched off interlocks





Interlock program benefits

Switched off interlocks more than 1 day	2013 (H2)	2014 (H1)
Pcs.	912	852
Days	26.924	18.434
Total switched off interlocks	**2013 (H2)**	**2014 (H1)**
Pcs.	2172	2123
Days	29.668	21.900

	2013 (H1-H2)	2014 (H1)
Interlock relevant events (pcs.)	111	22
Unit shutdowns due to interlocks (pcs.)*	11	0

*2013 /11 pcs. shutdowns = 84 lost operation hours

Calculated loss based on EDC is **1.000.000€**

EDC: Equivalent Distillation Capacity – Solomon study

E-FLARE

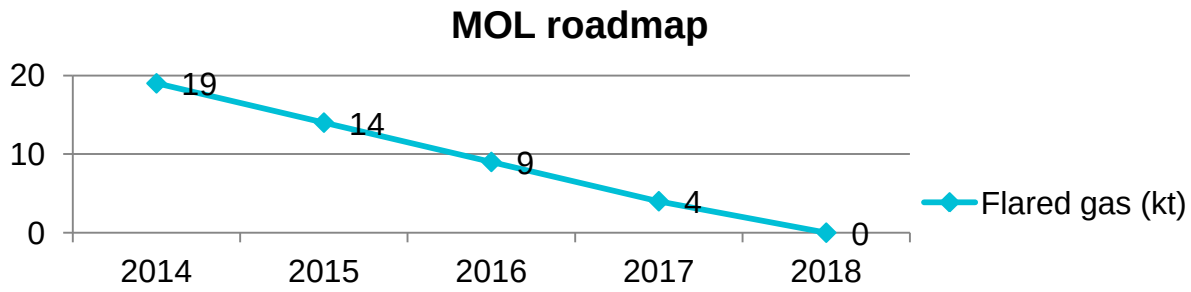
Flaring problems at Danube Refinery

In 2013 Danube Refinery burned 22 kt gas during normal operation, which total cost was 4.5M EUR

According to the Refinery roadmap goal this has to be reduced to zero until 2018

Aim of the project to reduce the losses via full PDCA cycle establishment – 2014 Q2 result is 8kt

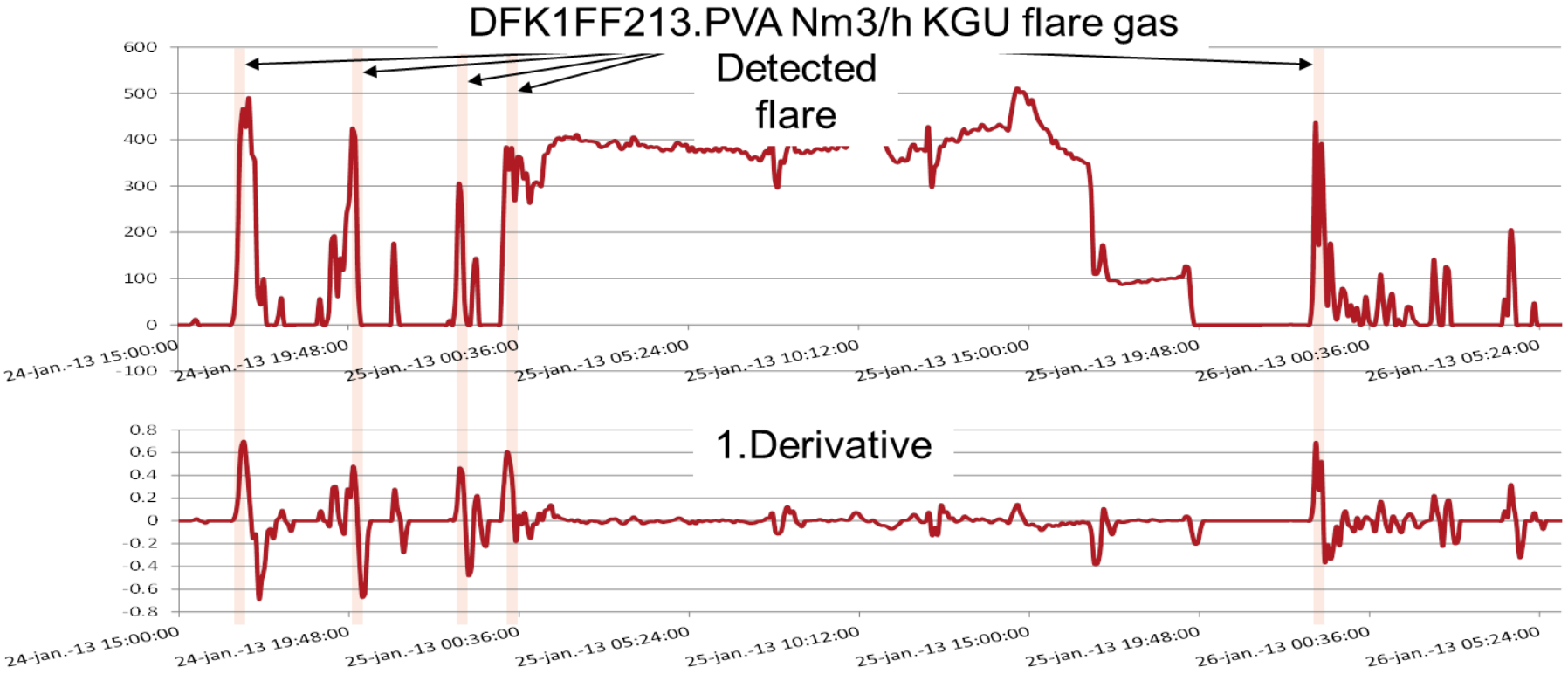
MOL initiated E-flare program, which uses PI Client tools and Opralog E-logbook application to record flaring activities



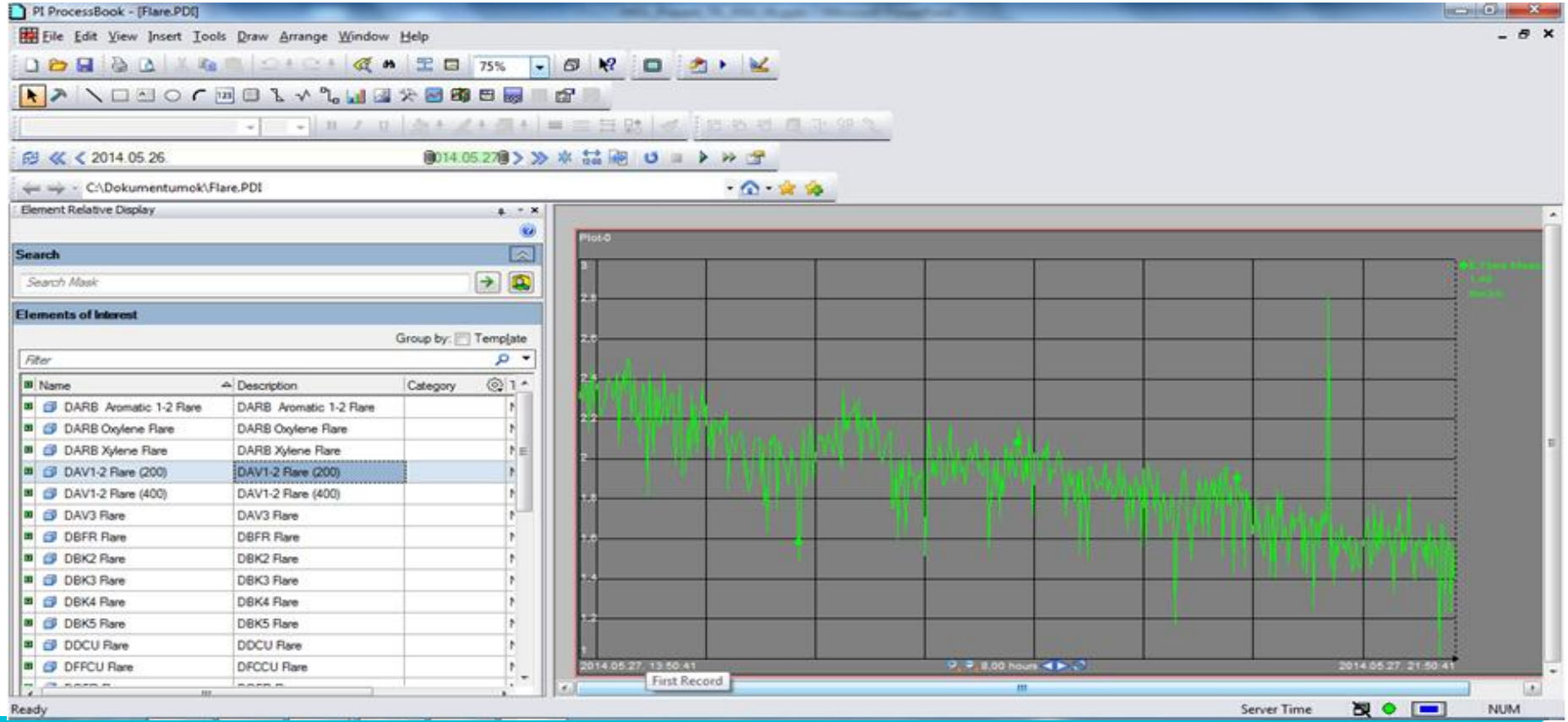
Planned and on-going actions

- Identify all flaring activities
- Implement E-flare report with PI Notifications
- Optimize flare gas recovery compressors operation
- Investigate root causes of detected flaring
- Ensure attentive drainage of spray catchers
- Reduce pressure of expansion tanks
- Revise refinery plan, with special attention to those units that consume or produce fuel gas

Example



PI ProcessBook Element Relative Display



TECHNOLOGICAL CARD

Technological card

Operational mode: 16

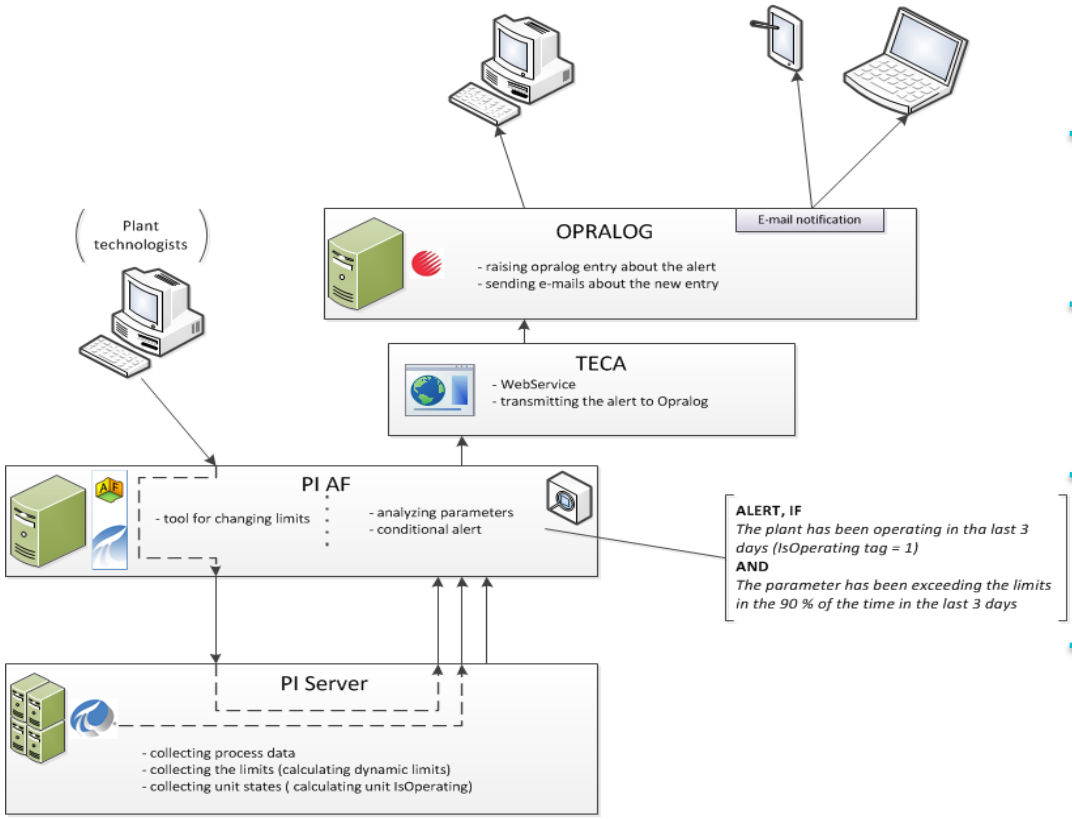
Description	Tag name	EU	Specification	Actual value	
Feed					
Processing maximum	AFQ005	t/h m3/h	171 212	123,01	
Water content of feed	labor	m%	max. 3	0,05	
Electric desalter No. 196					
Inlet temperature	AT215	°C	max. 150	110,32	
Pressure in desalters	SPCHL011	barg	max. 16	9,20	
Pre-distillation column No. 101					
Head temperature	ATC002	°C	50-130	86,85	
Inlet temperature	AT177/178	°C	120-200	170,21	164,17
Outlet temperature of red. crude oil	AT171	°C	min. 100	156,51	
Head pressure	APCH008	barg	0,5-4,0	1,51	
Atmospheric heater No. 107					
Inlet pressure	AP010/011	barg	max. 14,0	6,60	6,35
Outlet temperature	ATC004/005	°C	260-330	286,16	286,33

Collect and monitor the most important parameters of the units to control operation and ensure safety and efficiency.

Limit settings are always declared in the official technological regulations

Technological card parameters were visualized in PI ProcessBook before PI AF and Opralog solution

Technological card



Technological card parameter definition in PI AF level

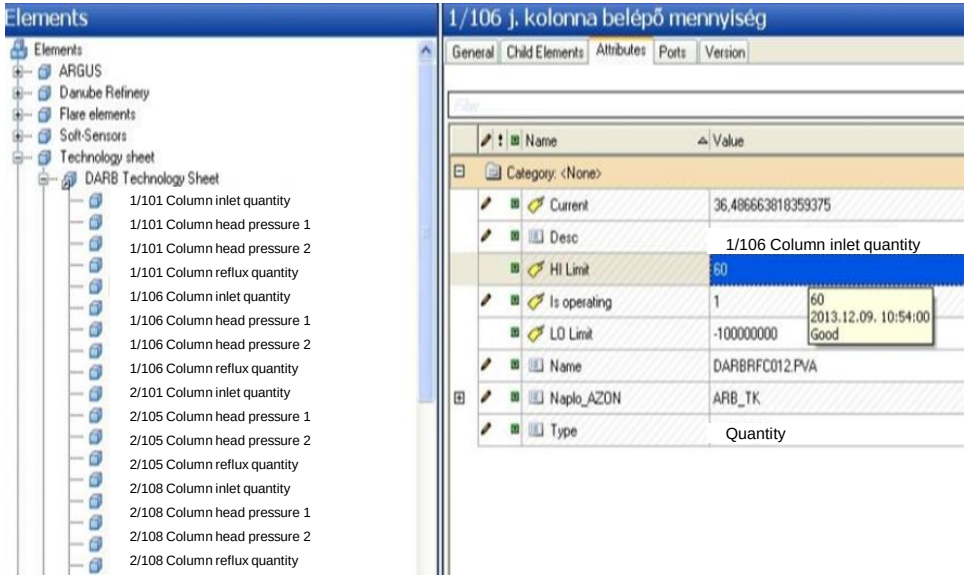
Data storage in PI Server level

PI AF Technological card limit data evaluation

PI AF & Opralog connection via Web service

Opralog notification about Technological cards' entries

Technological card / PI AF



Current, actual value of the parameters

Description: Equipment name in Opralog (E.g.Column 1/106)

HI / LO Limits

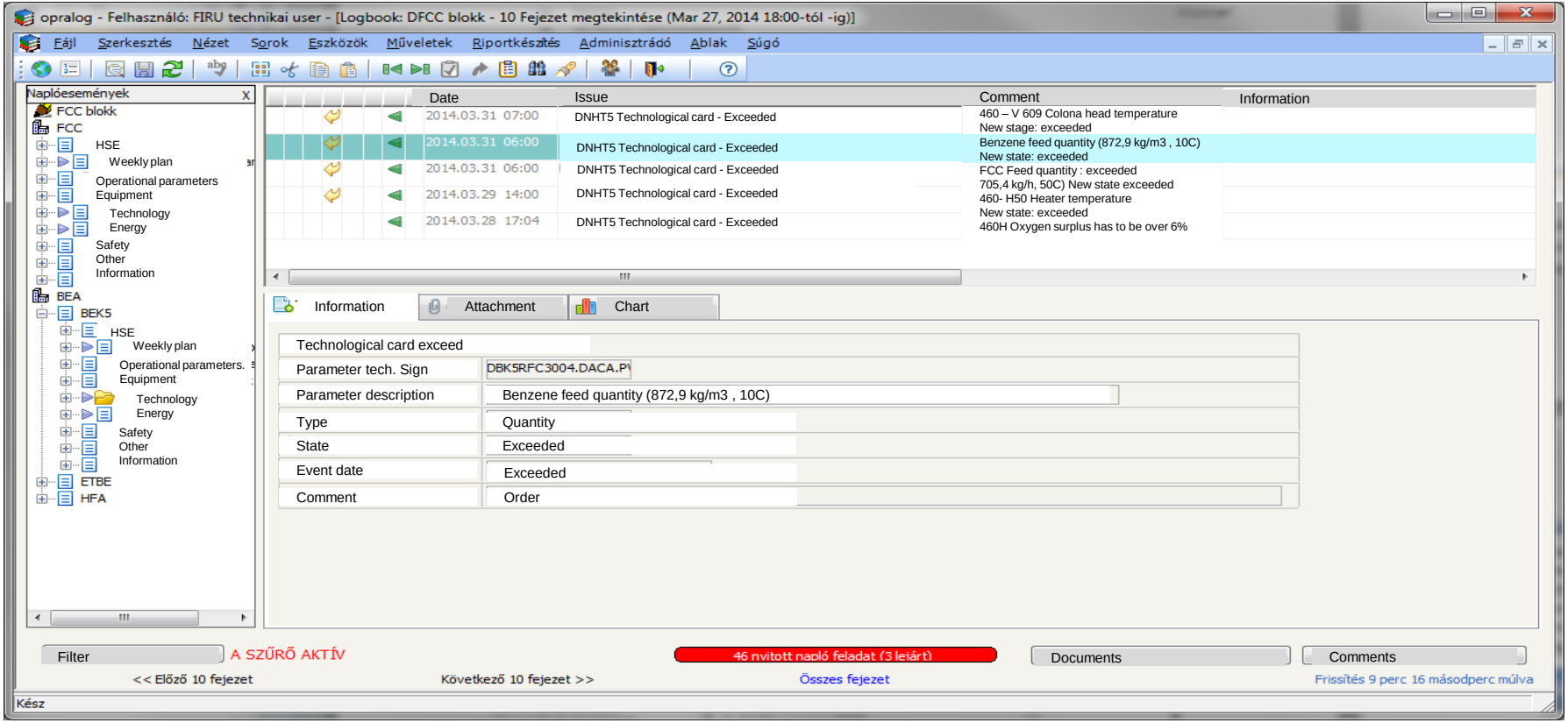
Name: PI Tag (E.g.DAV2CFN1308)

Logbbook_ID : Opralog shift logbook identifier

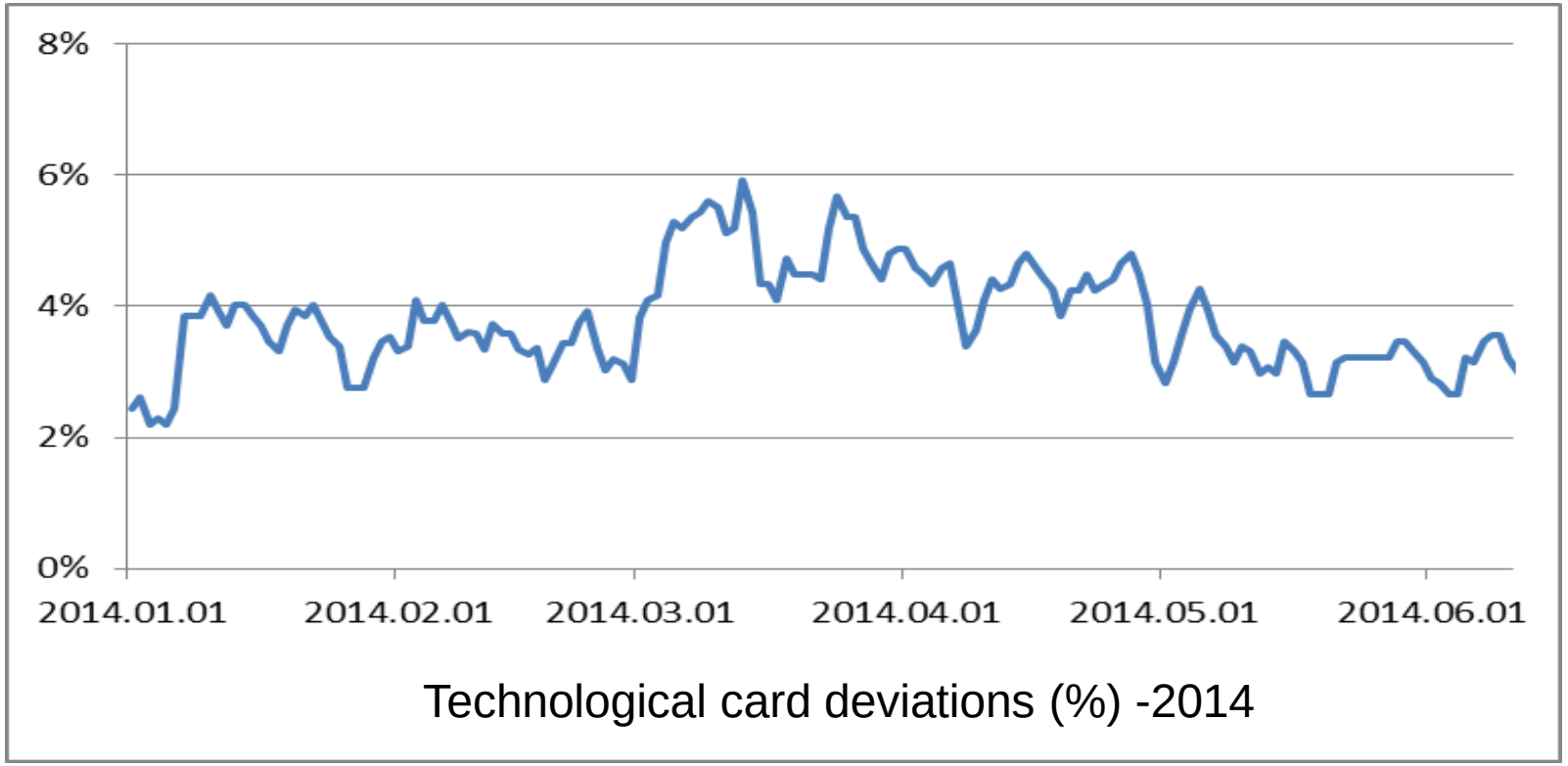
Parameter type (E.g. :Quantity)

Is operating - value is 1 in case of normal operation of the unit

PI AF & Opralog notifications



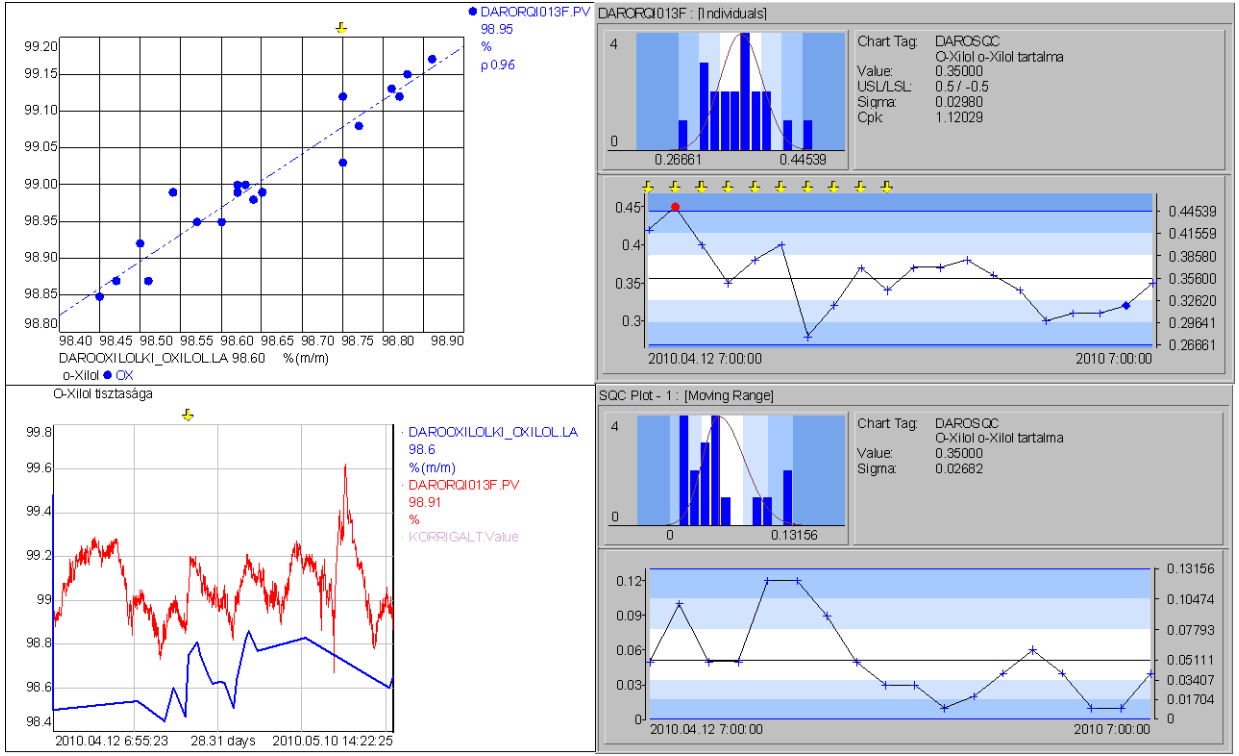
Technological card deviations



Technological card deviations (%) -2014

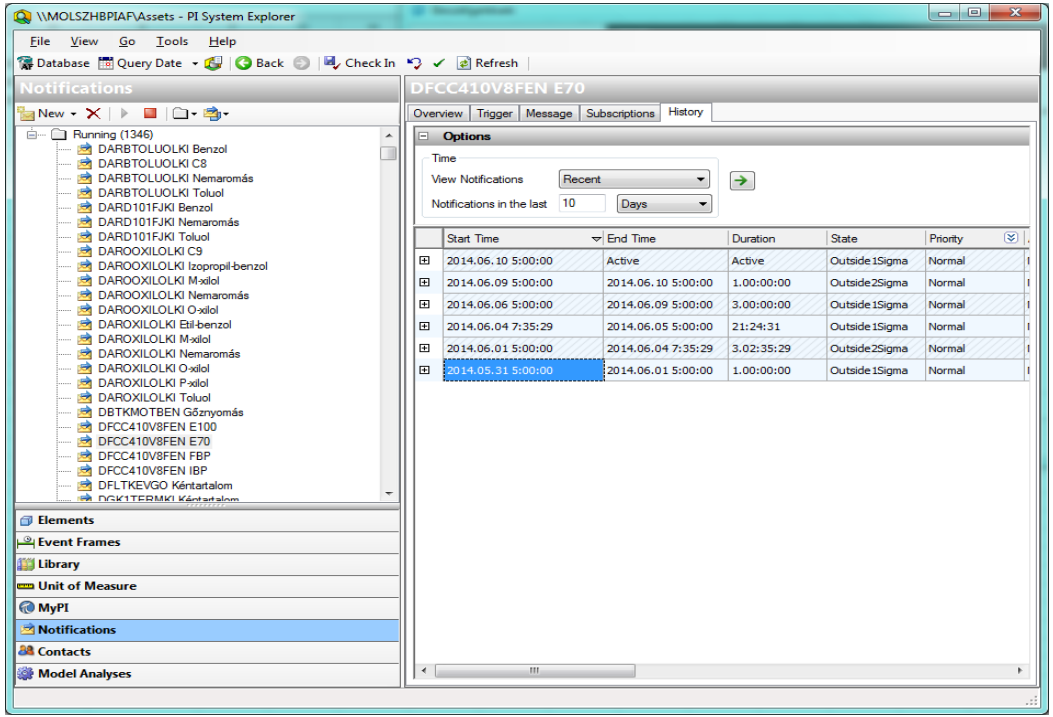
ANALYZERS RELIABILITY

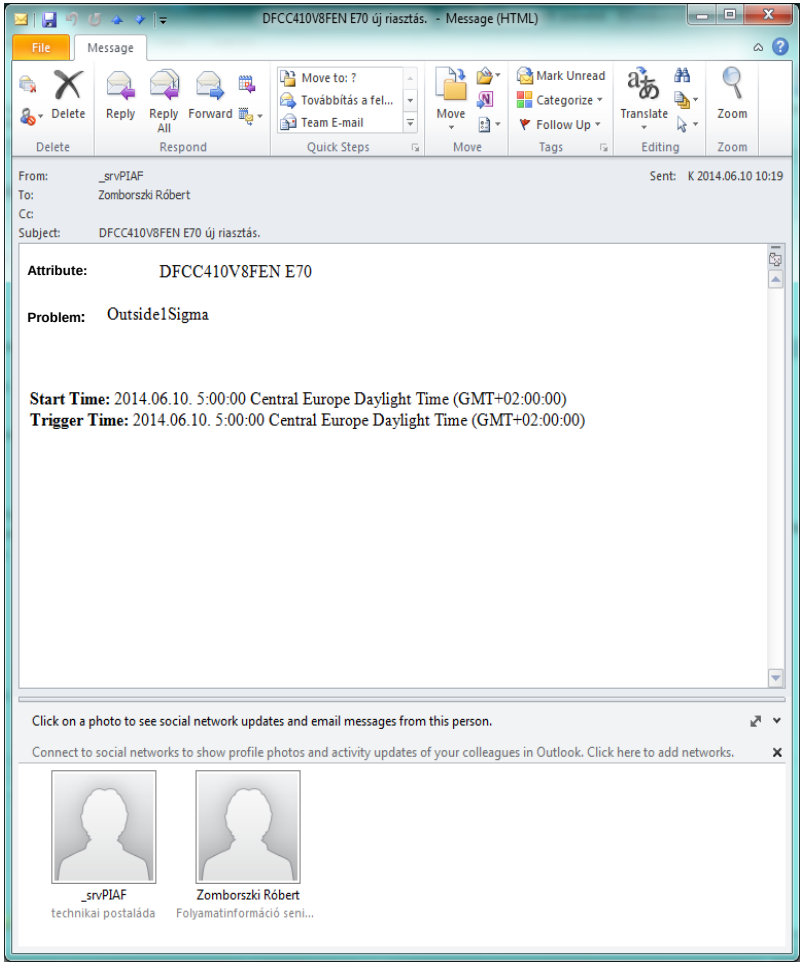
ARGUS - Analyzer Reliability



- Continuous validation of process analyzers
- Western electric patterns
- Common platform for laboratory and process data
- Measurement accuracy
- Trend tracking

ARGUS Notification





Business results

- Reliability - productivity
- Operational availability
- One version of truth
- Measurement accuracy
- Quality control

SUMMARY

“One who is on the alert avoids danger even if one feels safe.”

- Process Safety Problems
  - Gaps in refinery safety management system
  - Risk management problems
  - Improper communication lack of user-friendly reporting system
- Process Safety Solutions
  - Suitable alarm & notification management
  - Sufficient process overview applying PI Client applications
  - Safety reports and audits
- Process Safety Support
  - PI Coresight
  - PI Asset Framework
  - PI ProcessBook
  - PI Notifications
  - PI Event Frames
  - PI DataLink

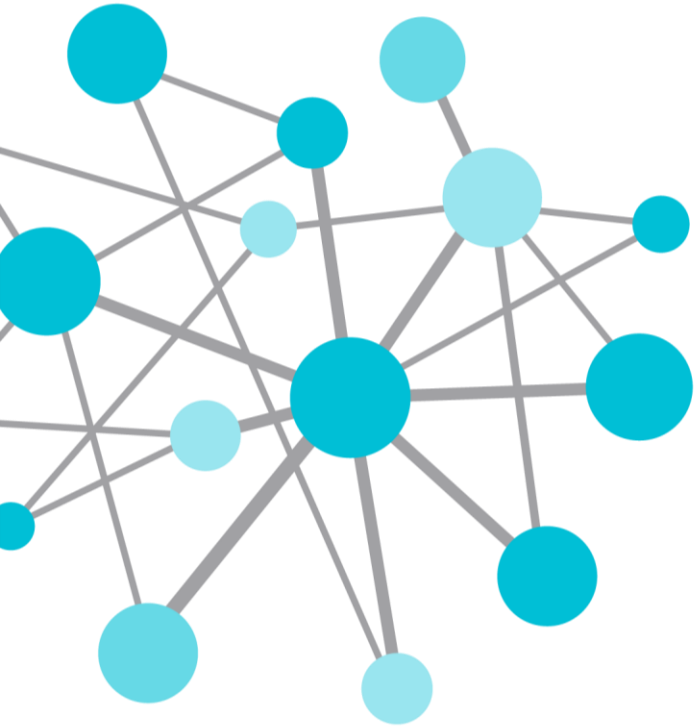
Tibor Komróczki

- tkomroczki@mol.hu
- Head of Process Information and Automation
- MOL, PLC

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**



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