

Increasing Efficiency and Process Safety with PI Notifications in MOL

Presented by **Tibor Komróczki**



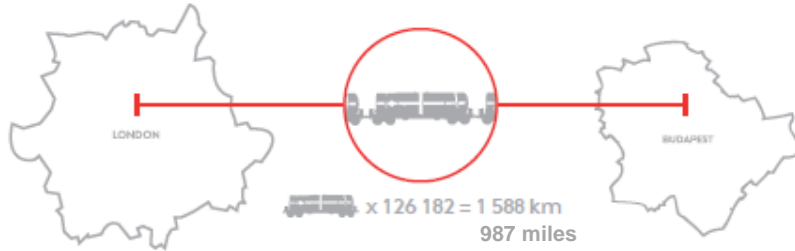


Agenda

- 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








- 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.



FORTUNE GLOBAL 500

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

MOL Group Downstream

6 production units

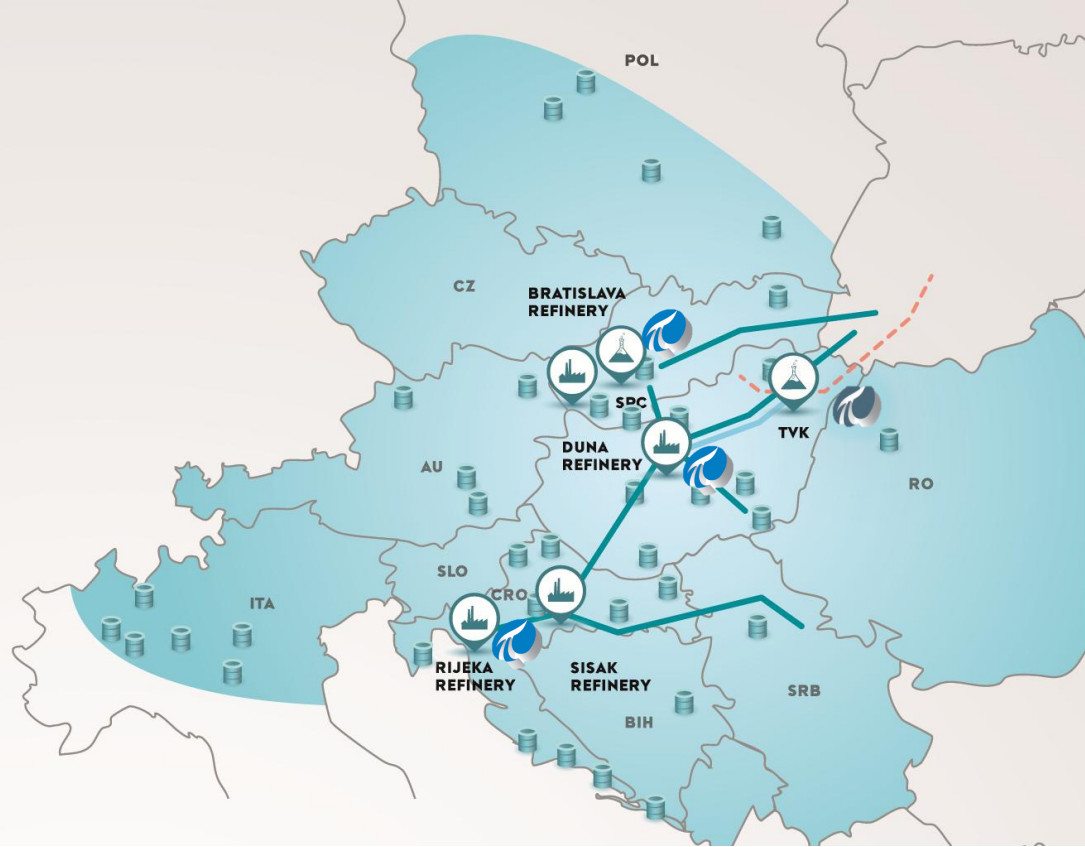
23.5 mtpa refining capacity

2.1 mtpa petrochemicals capacity

>1,900 filling stations

under 8 brands in 11 CEE

370 000 PI Tag capacity



DOMESTIC AND CORE MARKETS



REFINERY



PETROCHEMICAL PLANT



PRODUCT DEPOT



OIL PIPELINE



PETCHEM PIPELINE

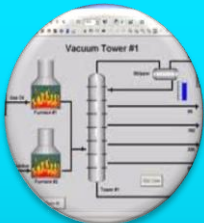


ETHYLENE PIPELINE



PI SYSTEM & MOL

PI System portfolio of MOL PLc.2014



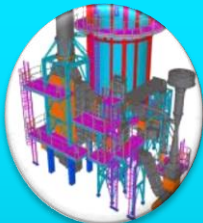
PI Clients

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



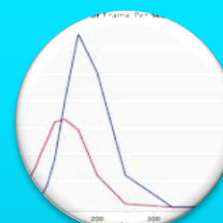
PI Notifications

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

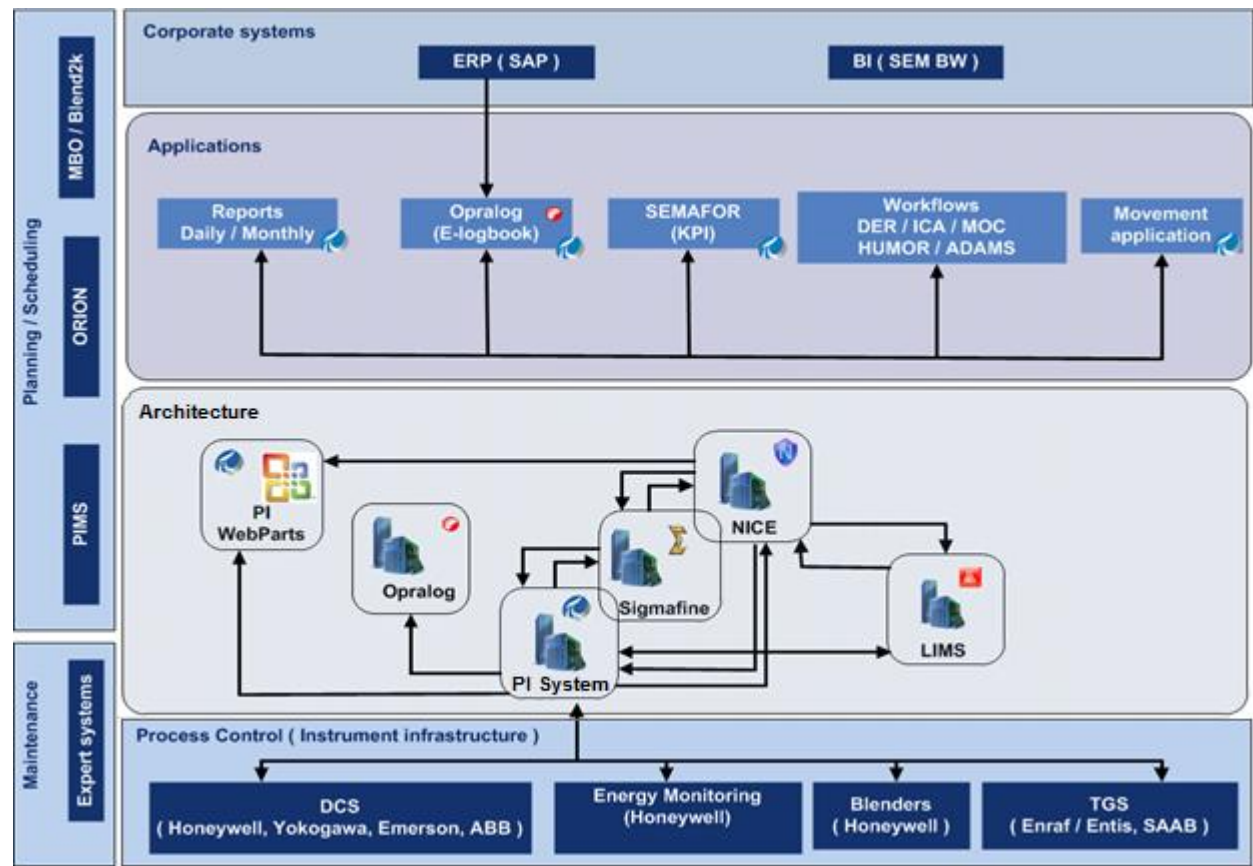
- System administration
- PI Asset Framework (PI AF) and PI Notifications development and support
- End user, client support
- PI System training for end users
 - PI Clients applications
 - PI AF

Other responsibilities

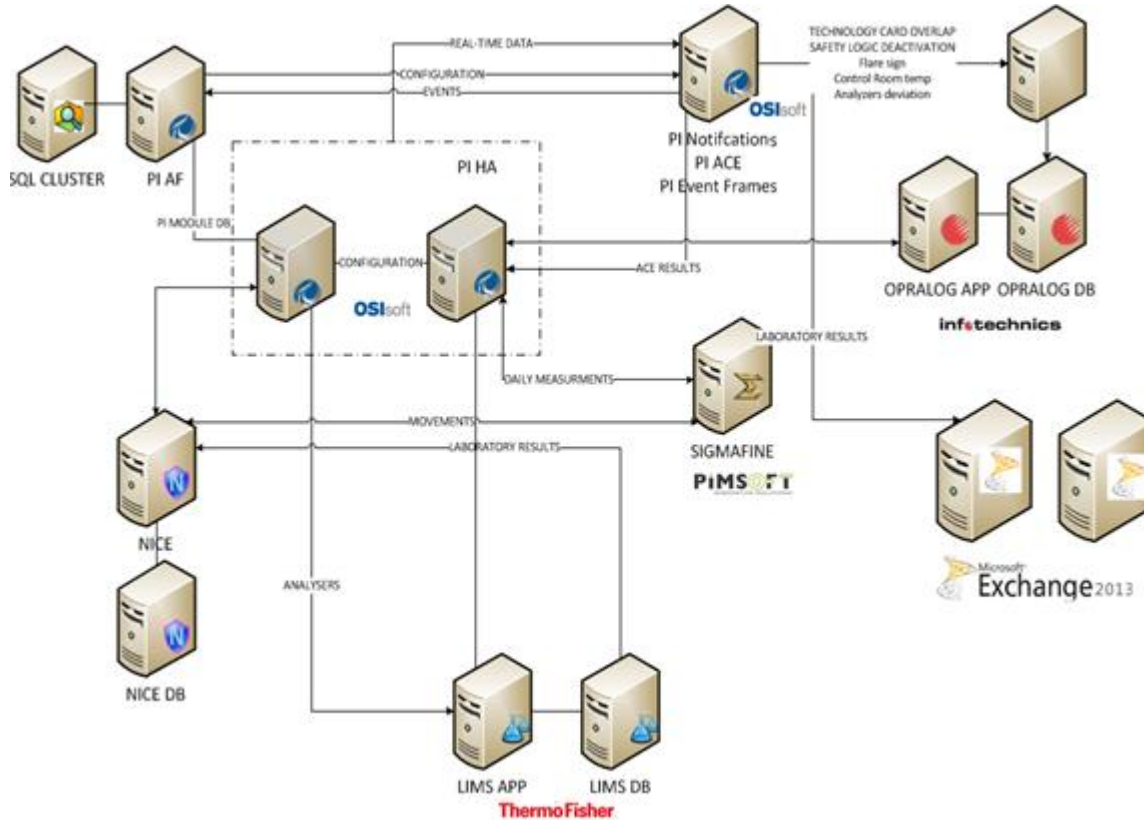
- Project development & support
- APC operation
- NICE system (in-house development) support
- Energy monitoring
- Alarm management
- KPI management (SEMAFOR)
- Industrial Network operation
- Loop monitoring
- Operator Training Simulator

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

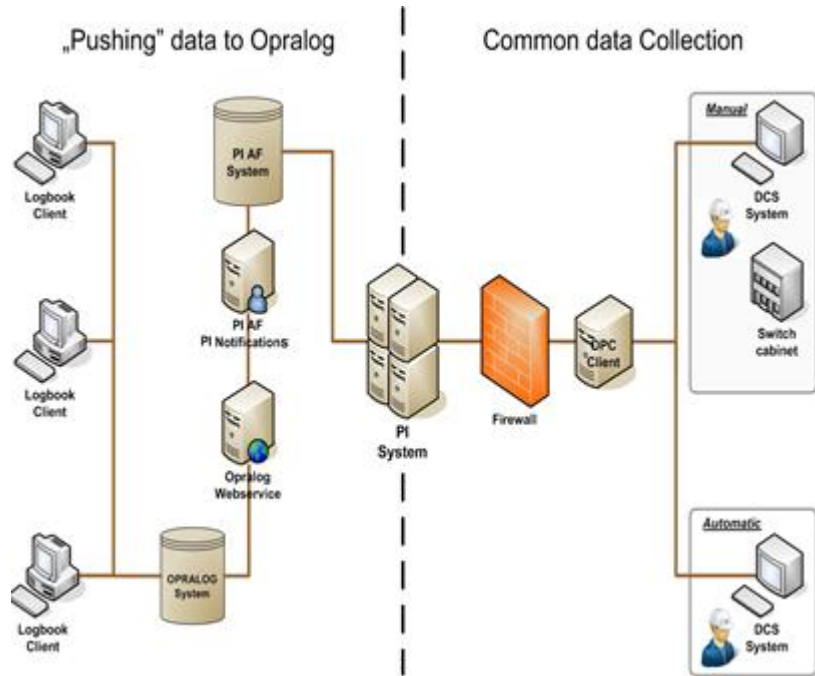
Controlling safety via PI System tools





INTERLOCKS

Interlock Logbook Migration into Opralog



Information about the switch (name, description)

Information about the status (new state, event time)

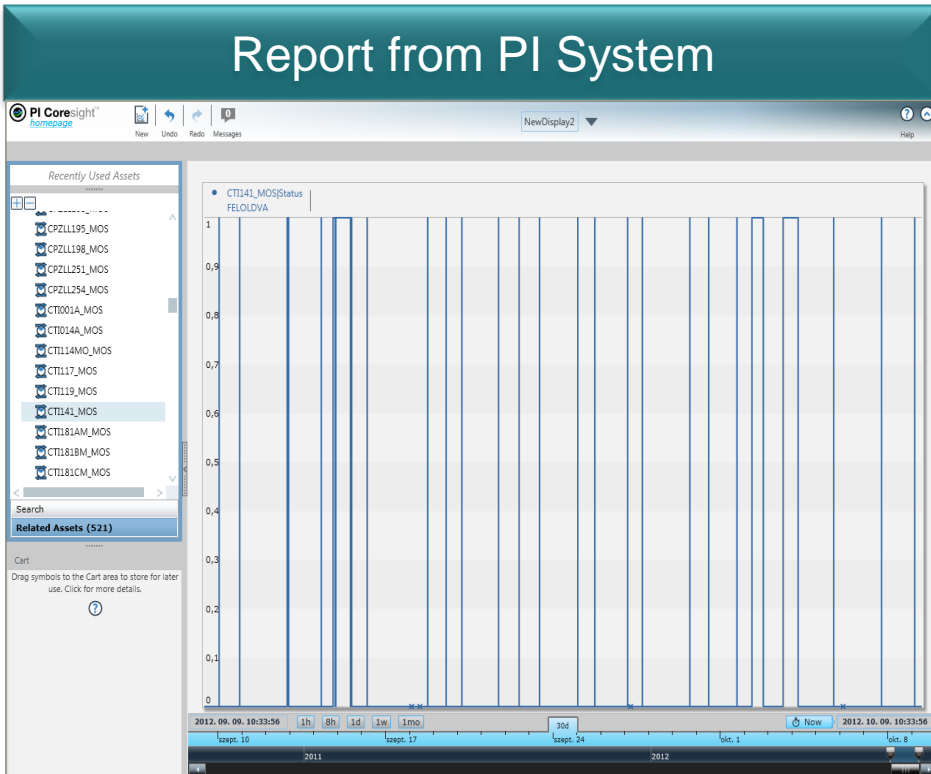
Who turned on/off?

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

 MOI Nyrt.
H-1117 Budapest, Október huszonegymadik u.18.
Termékellátás és Kereskedelem - Finomítás MOI

**Elektronikus műszaknapló
(e-logbook)**
ADATBÁZIS: LANCZ, MOI, NY

[DBIT Retsznapló](#)

Időpont	Bejegyzés ideje	Bejegyzés	Megjegyzés
2012.09.11 08:53	2012.09.11 08:54	RETESZEK, DBIT1	MOS10_MOS retesz új állapot: NORMAL
Retsz feloldás/élesítés			
Retsz kapcsoló jele	MOS10_MOS		
Retsz leírása	108A Égőlevegő mennyiség MOS		
Új állapot	NORMAL		
Feloldás/élesítés ideje	11-Sep-2012 08:53		
Indoklás			
Engedélyező neve			
Végrehajtotta			
2012.09.11 08:54	2012.09.11 08:55	RETESZEK, DBIT1	MOS10_MOS retesz új állapot: FELOLDVA
Retsz feloldás/élesítés			
Retsz kapcsoló jele	MOS10_MOS		
Retsz leírása	108A Égőlevegő mennyiség MOS		
Új állapot	FELOLDVA		
Feloldás/élesítés ideje	11-Sep-2012 08:54		
Indoklás			
Engedélyező neve			
Végrehajtotta			
2012.09.13 07:16	2012.09.13 07:17	RETESZEK, DBIT1	108A_POS retesz új állapot: FELOLDVA
Retsz feloldás/élesítés			
Retsz kapcsoló jele	108A_POS		
Retsz leírása	108A Orsling indítás engedély POS		
Új állapot	FELOLDVA		
Feloldás/élesítés ideje	13-Sep-2012 07:16		
Indoklás			
Engedélyező neve			
Végrehajtotta			

Consequent, event based logging

Information Sharing

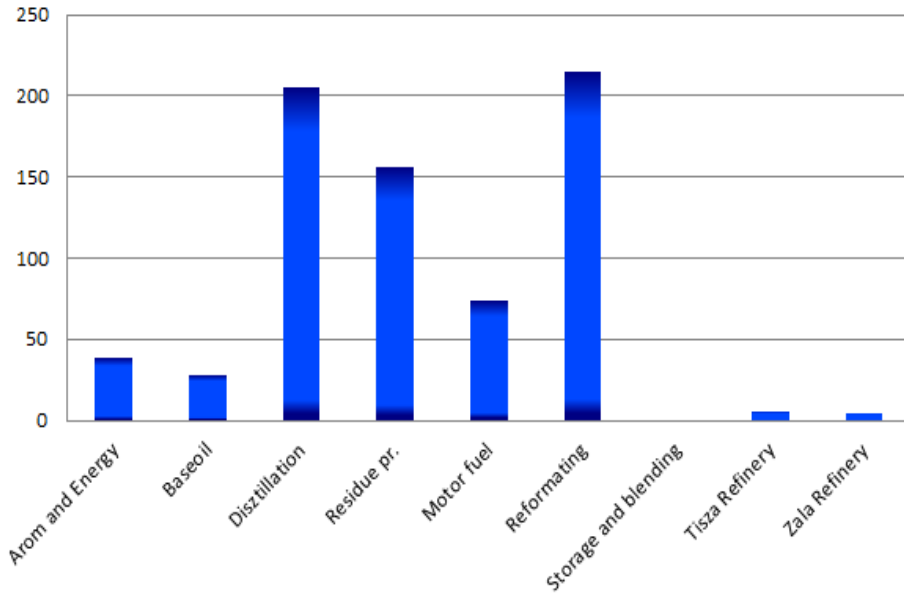
Support audits (PSM)

Easier incident investigation

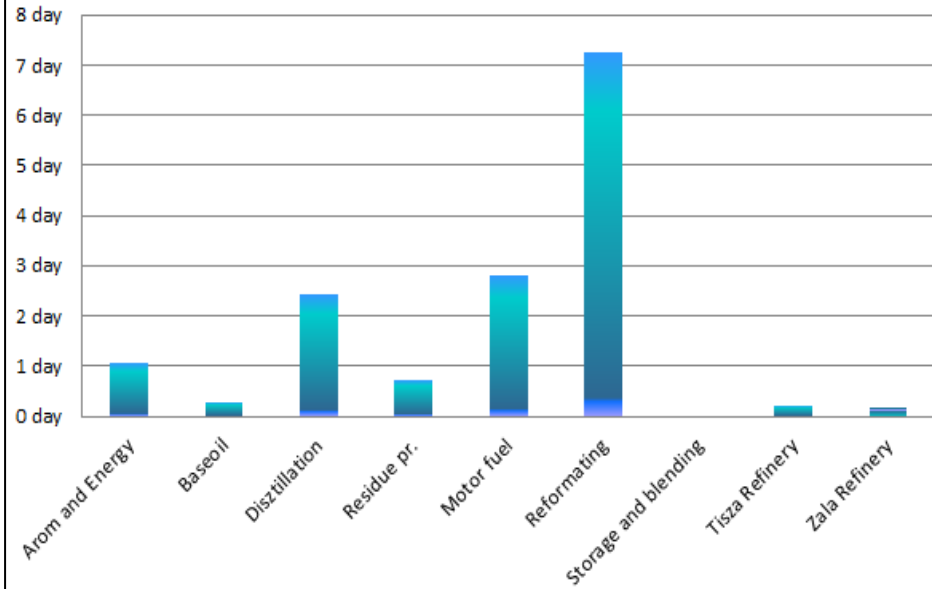
Highlights problematic fields

PSM monitoring- switched off interlocks

Interlock (pcs.) 01.01.2014 - 01.06.2014



Interlocks (Σ day) 2014.01.01 - 2014.06.01



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

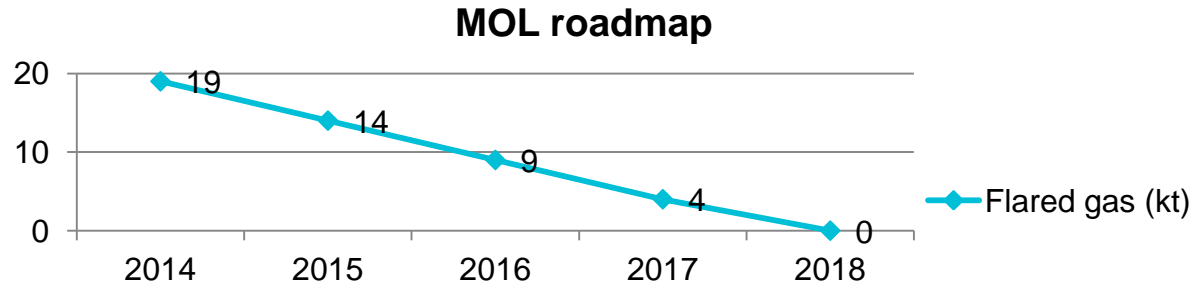


In 2013 Danube Refinery burned 22 kt gas during normal operation, which total cost was 4.5M EUR

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

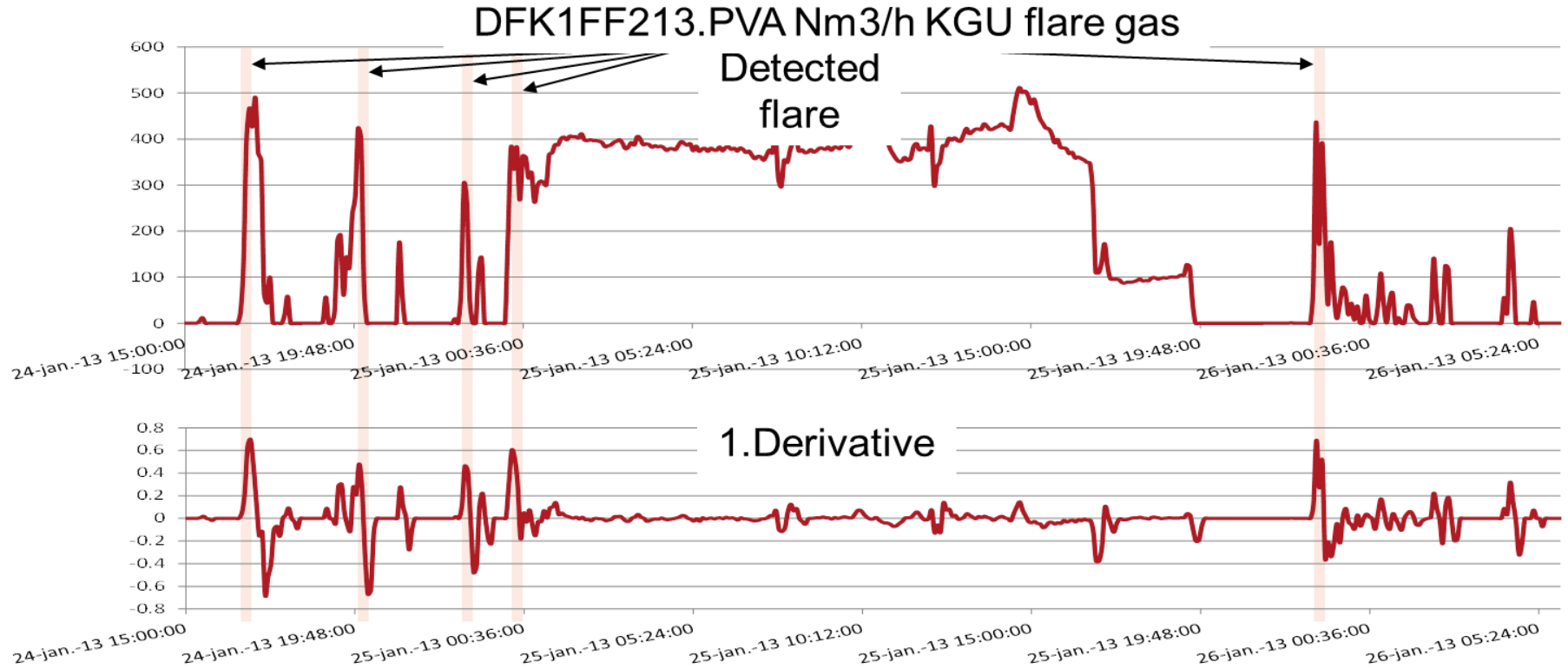
Investigate root causes of detected flaring

Ensure attentive drainage of spray catchers

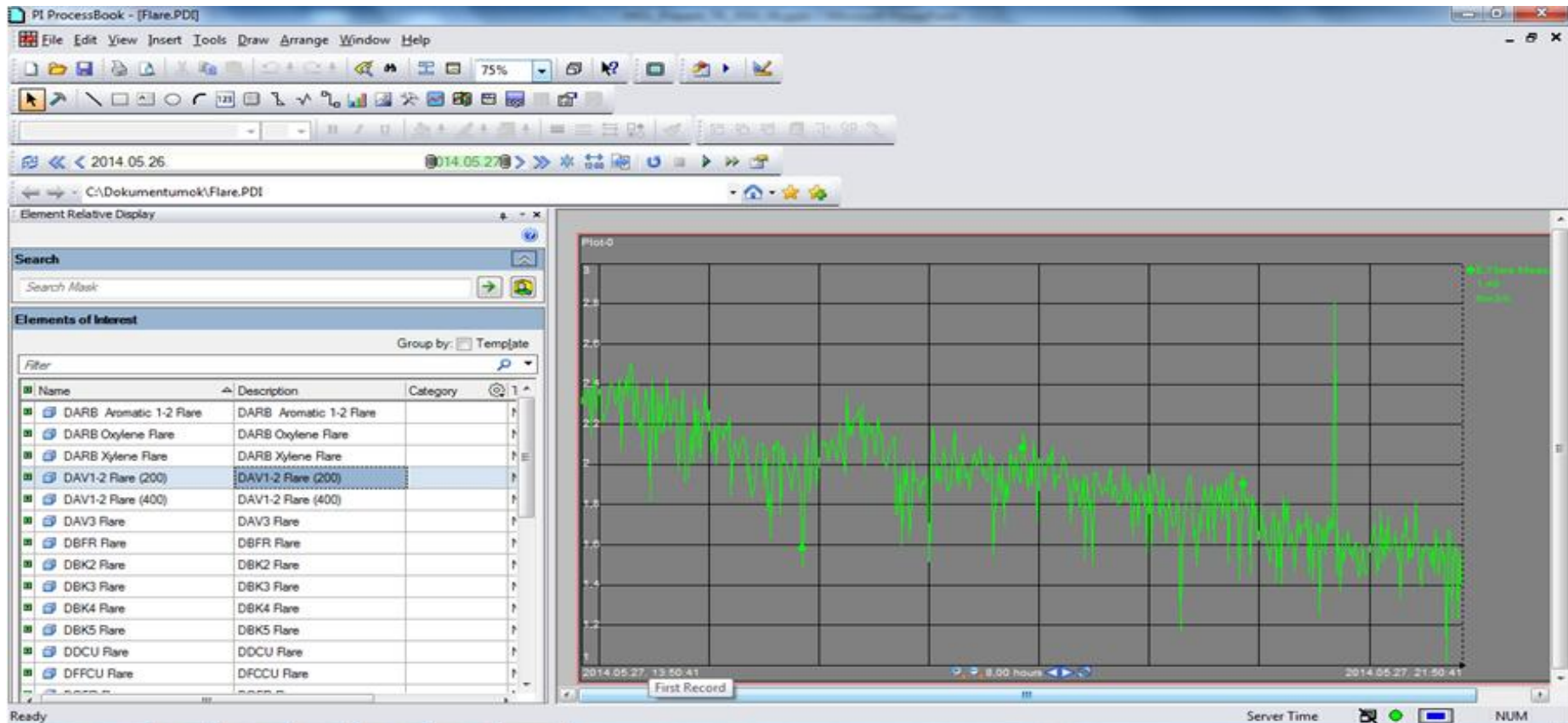
Reduce pressure of expansion tanks

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
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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

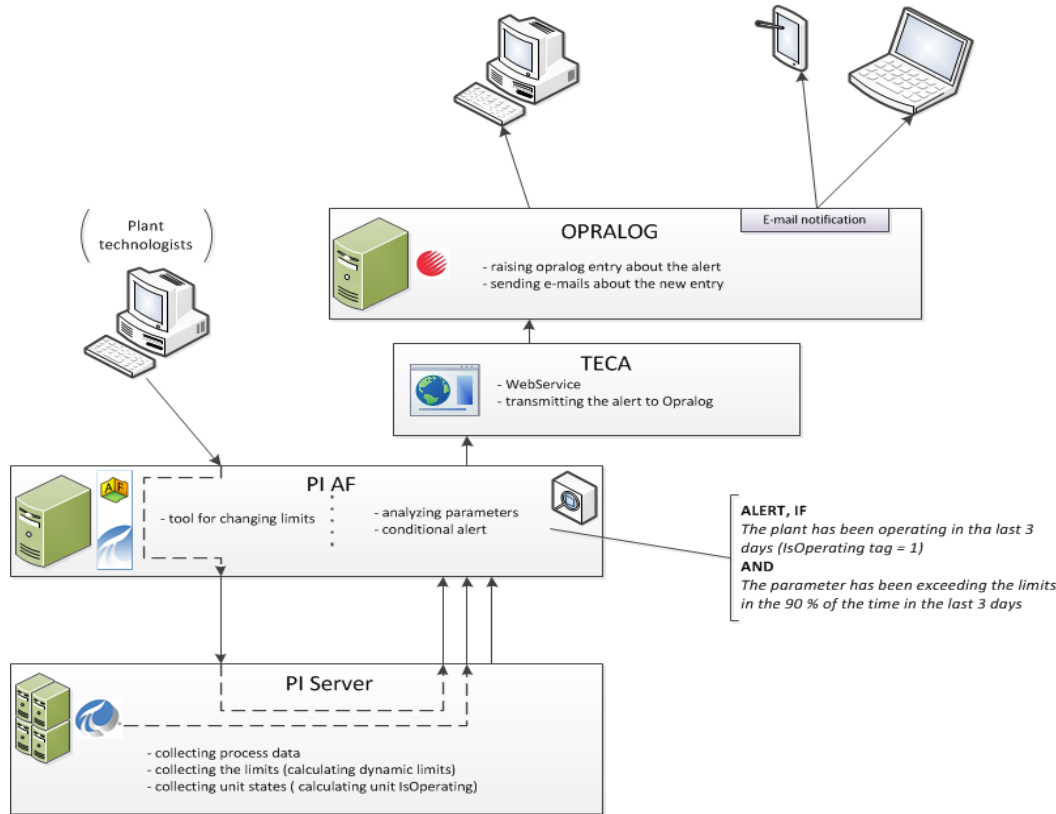
Inlet pressure	AP010/011	barg	max. 14,0	6,60	6,35
Outlet temperature	ATC004/005	°C	260-330	286,16	286,33

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

The screenshot displays the PI AF Technological card interface. On the left, a tree view under 'Elements' shows a hierarchy: ARGUS, Darube Refinery, Flare elements, Soft-Sensors, Technology sheet, and DARB Technology Sheet. The 'DARB Technology Sheet' is expanded, showing a list of elements including '1/106 Column inlet quantity'. The main panel shows the details for '1/106 j. kolonna belépő mennyiség'. The 'General' tab is active, showing a table of parameters. The 'HI Limit' parameter is highlighted, showing a value of 60. A tooltip for the 'HI Limit' parameter displays the value 60, the date and time 2013.12.09. 10:54:00, and the status 'Good'.

Name	Value
Current	36.486663818359375
Desc	1/106 Column inlet quantity
HI Limit	60
Is operating	1
LO Limit	-100000000
Name	DARBRFC012.PVA
Naplo_AZON	ARB_TK
Type	Quantity

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)

Logbook_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

opralog - Felhasználó: FIRU technikai user - [Logbook: DFCC blokk - 10 Fejezet megtekintése (Mar 27, 2014 18:00-tól -ig)]

Fájl Szerkesztés Nézet Sorok Eszközök Műveletek Riportkészítés Adminisztráció Ablak Súgó

Naplóesemények

- FCC blokk
 - FCC
 - HSE
 - Weekly plan
 - Operational parameters
 - Equipment
 - Technology
 - Energy
 - Safety
 - Other
 - Information
- BEA
 - BEK5
 - HSE
 - Weekly plan
 - Operational parameters
 - Equipment
 - Technology
 - Energy
 - Safety
 - Other
 - Information
 - ETBE
 - HFA

Date	Issue	Comment	Information
2014.03.31 07:00	DNHT5 Technological card - Exceeded	460 - V 609 Colona head temperature New stage: exceeded	
2014.03.31 06:00	DNHT5 Technological card - Exceeded	Benzene feed quantity (872,9 kg/m3 , 10C) New state: exceeded	
2014.03.31 06:00	DNHT5 Technological card - Exceeded	FCC Feed quantity : exceeded 705,4 kg/h, 50C) New state exceeded	
2014.03.29 14:00	DNHT5 Technological card - Exceeded	460- H50 Heater temperature New state: exceeded	
2014.03.28 17:04	DNHT5 Technological card - Exceeded	460H Oxygen surplus has to be over 6%	

Information Attachment Chart

Technological card exceed

Parameter tech. Sign DBK5RFC3004.DACA.P1

Parameter description Benzene feed quantity (872,9 kg/m3 , 10C)

Type Quantity

State Exceeded

Event date Exceeded

Comment Order

Filter A SZŰRŐ AKTÍV

<< Előző 10 fejezet

Következő 10 fejezet >>

Összes fejezet

46 nvtott napló feladat (3 leírt)

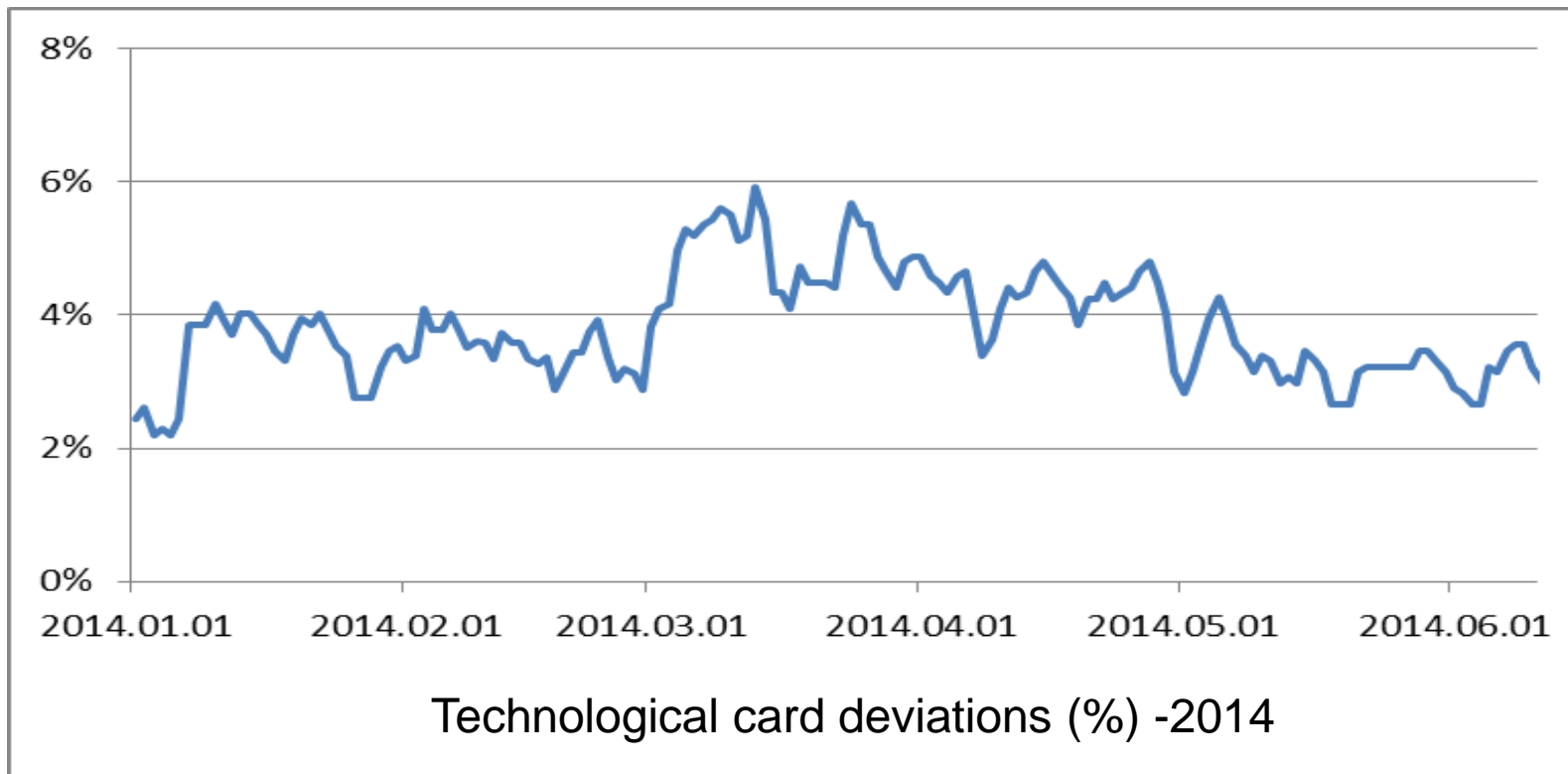
Documents

Comments

Frissítés 9 perc 16 másodperc múlva

Kész

Technological card deviations





ANALYZERS RELIABILITY

ARGUS - Analyzer Reliability

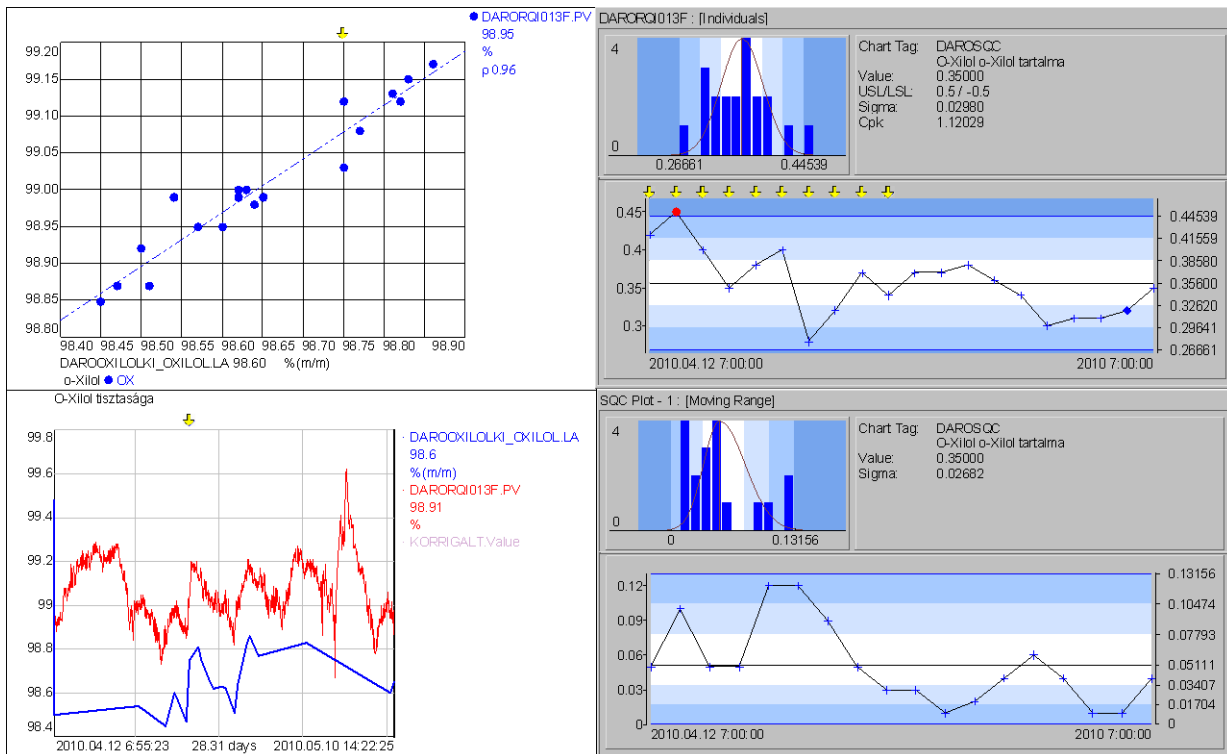
Continuous validation
of process analyzers

Western electric patterns

Common platform for
laboratory and process
data

Measurement accuracy

Trend tracking



ARGUS Notification

The screenshot shows the ARGUS PI System Explorer interface. On the left, a tree view lists various assets under the 'Running (1346)' category, including items like 'DARBTOLUOLKI Benzol', 'DARBTOLUOLKI C8', and 'DFCC410V8FEN E100'. The 'Notifications' section is selected. On the right, the 'DFCC410V8FEN E70' notification is displayed. It includes tabs for 'Overview', 'Trigger', 'Message', 'Subscriptions', and 'History'. The 'Options' tab is active, showing a table of notification events.

Start Time	End Time	Duration	State	Priority
2014.06.10 5:00:00	Active	Active	Outside1Sigma	Normal
2014.06.09 5:00:00	2014.06.10 5:00:00	1.00:00:00	Outside2Sigma	Normal
2014.06.06 5:00:00	2014.06.09 5:00:00	3.00:00:00	Outside1Sigma	Normal
2014.06.04 7:35:29	2014.06.05 5:00:00	21:24:31	Outside1Sigma	Normal
2014.06.01 5:00:00	2014.06.04 7:35:29	3.02:35:29	Outside2Sigma	Normal
2014.05.31 5:00:00	2014.06.01 5:00:00	1.00:00:00	Outside1Sigma	Normal

The screenshot shows an Outlook message window titled 'DFCC410V8FEN E70 új niasztás. - Message (HTML)'. The message is from '_srvPIAF' to 'Zomborszki Róbert', sent on 2014.06.10 at 10:19. The subject is 'DFCC410V8FEN E70 új niasztás.'.

Attribute: DFCC410V8FEN E70

Problem: Outside1Sigma

Start Time: 2014.06.10. 5:00:00 Central Europe Daylight Time (GMT+02:00:00)
Trigger Time: 2014.06.10. 5:00:00 Central Europe Daylight Time (GMT+02:00:00)

Below the message content, there is a section for social network updates and email messages from this person, featuring profile photos and names of contacts like '_srvPIAF' and 'Zomborszki Róbert'.

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

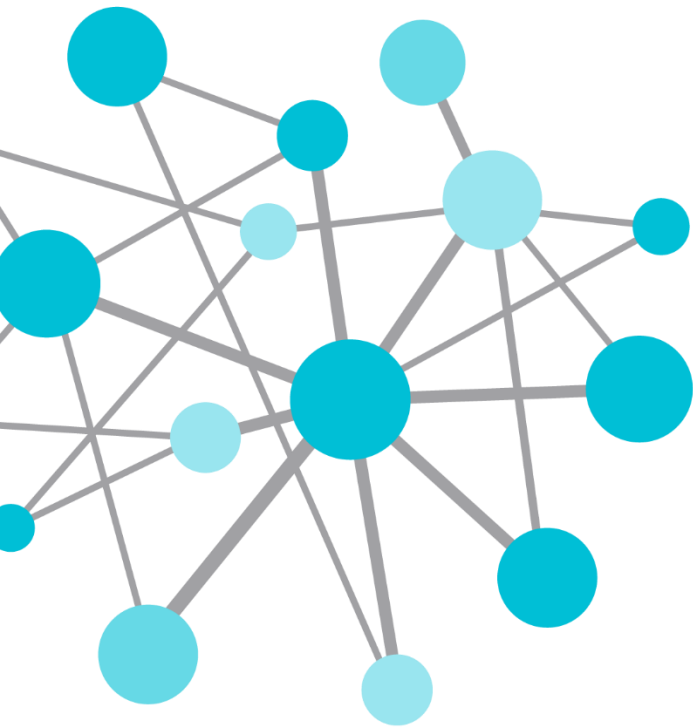
- Process Safety Support

- PI Coresight
- PI Asset Framework
- PI ProcessBook
- PI Notifications
- PI Event Frames
- PI DataLink

Tibor Komróczy

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



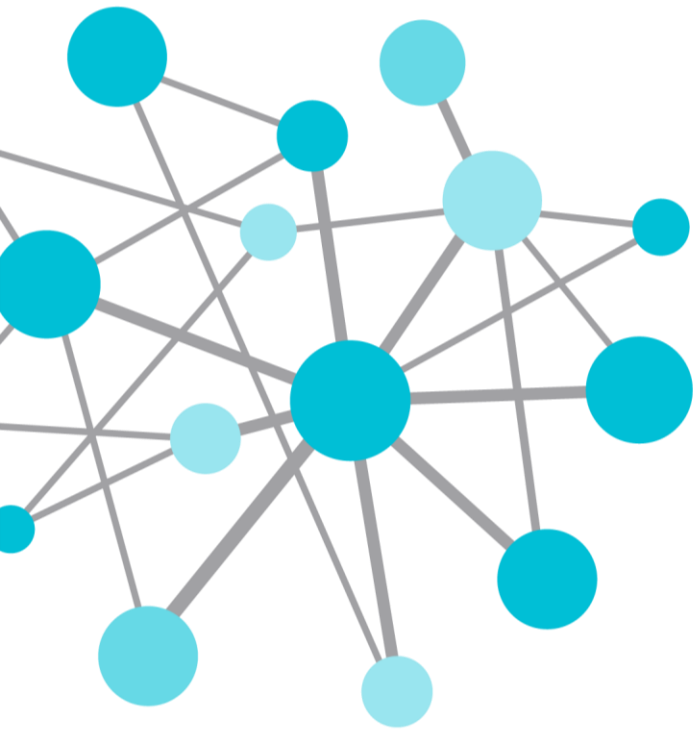


Questions

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



State your
**name &
company**



THANK
YOU

Brought to you by  **OSI**soft.

Please don't forget to...

Complete the online survey for
this session

eventmobi.com/emeauc14



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#UC2014

