

## Realizing the **Power of Data** using the PI System at Rompetrol

Presented by Olimpia Manea



## **Agenda**

- Rompetrol
- Ludan Engineering
- Rompetrol Refinery Information System and the OSIsoft products
  - OSIsoft products at Rompetrol Refinery
  - PI data sources
  - System Architecture
- Why PI
  - Excel DataLink Reports
  - Online Reports
  - Rompetrol Refinery PI Process Book
    - Crude unit
    - Crude oil tanks
    - Operational KPI
- From Past to Future
- Conclusions



## Rompetrol

- A leader in the regional oil field
- A multinational company
- Activities in 12 countries with over 7000 employees
- Strong operational base in:
  - The Black Sea region
  - The Mediteranean Sea region



## Rompetrol

- With activities in each sector of the oil and gas, The Rompetrol Group has major operations in refining, petrochemical, retail, trading, exploration, production and industrial services, logistics in Romania, France, Spain, Republic of Moldova, Georgia.
- The group has a strong network of trade of oil products through subsidiary companies located in Spain and Switzerland (Dyneff and Vector Energy).
- In Romania, Rompetrol owns the most performant refinery in the country, Petromidia, located at Navodari.



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## Rompetrol

In 2007, the acquisition of The Rompetrol Group by the Kazakhstan national oil and gas company, KazMunayGaz, transformed Rompetrol into an energy bridge between the natural resources located in Central Asia and the markets all over Europe. Moreover, in Kazakhstan, Rompetrol provides exploration and production services, as well as industrial services, the company playing an important role in the reconstruction of the country's refineries.



# Rompetrol Petromidia Refinery & Petrochemicals

- Started activity in 1979
- Romanian and foreign technology
- Rompetrol Refinery can process a wide variety of crude.
- Refinery capacity = 5.300.000 tones/year.
- High quality control and information systems:
  - DCS
  - Information System = OSIsoft Plant Information



## Rompetrol Vega Refinery

- The Vega Refinery, with 100 years experience in the field of crude oil refining, has evolved from a classical refinery to a producer and provider of special products (ecological solvents, bitumen with special destination, ecological fuel for heating or other specialized products).
- In synergy with Petromidia Refinery, raw materials integrally ensured by the Black Sea shore refinery allows development of special products with high additional value.



## **Ludan Engineering**

- A multidisciplinary service provider for process industry, member of international Ludan Group
- The Company was established in 1997. Today has 80 specialists, acting in all countries from East European region
- Competences: Complete Engineering, Procurement, Construction and Construction Supervision, Project Management & Consultancy
- Special Competences: Turn Key, Turnaround Management,
   Independent Automation Services, Implementation of Management
   Support Tools (PI & MAXIMO)



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## Rompetrol PI system

- Implementation started in 2004
- By Ludan Engineering as part of Petromidia modernization project
- Further upgraded and extended to other data sources



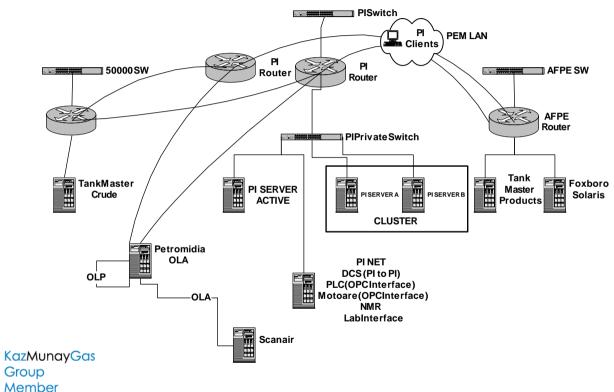


## Rompetrol PI system

- PI Enterprise Server (3.4.380.36): 60000 tags
- PI Client Application:
- ComboPack Individual (PI ProcessBooK&PI Data Link) - 125 users
  - PI AF Explorer: 1.3.0.1434
  - AF Modeler Add-in: 1.1.1.1323a



## PI system architecture



## PI data sources and interfaces

Field instrumentation

**PLCs** 

DCS for Production Area

DCS for Utilities Area

Tank Master for Crude Tanks

Tank Master for Products Tanks

NMR- online analyzer

9 Berth

Manual Data Entry

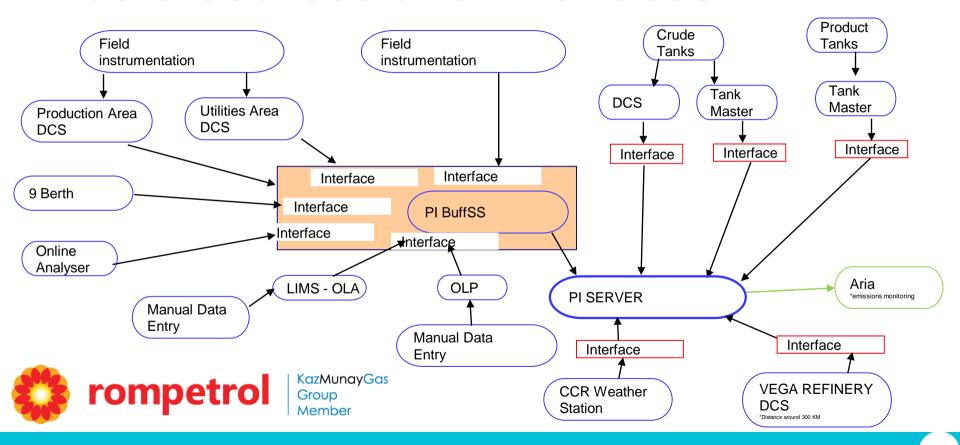
Lab – OLA

Process Information - OLP

Blending system



## PI data sources and interfaces



## Why PI

- Rompetrol need secure, efficient ways to communicate and collaborate across multiple plants and locations.
- Rompetrol use the OSIsoft PI System to provide the real-time data infrastructure and collaboration tools they need to meet key challenges, including:
  - Optimizing production
  - Increasing energy efficiency



## Why PI

- ONE DATA BASE for reports
- REAL TIME updates
- An overview of the entire refinery process data in real time:
- Production Parameters:
  - Temperature
  - Pressure
  - •Flows
  - Level
- Equipment Health status and Period of On-line Operation



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## Why PI

#### **Excel Reports before PI DataLink**

- A huge number of reports delivered by e-mail
- Various data sources
- Inconsistencies between figures
- Large volume of calculations

#### Excel Reports - with PI Data Link

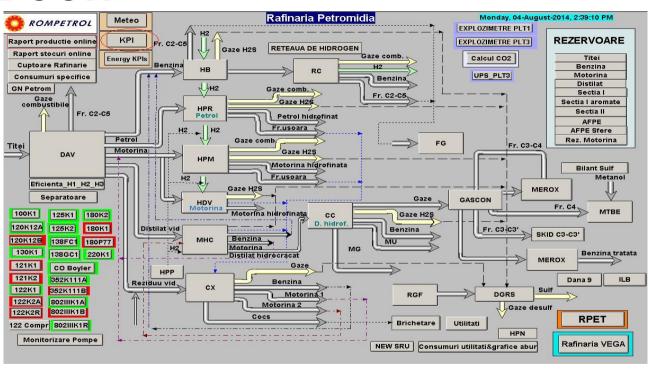
- Performance computing module
- One database for data process
- The information is updated in real time
- Formulas predefined



### PI ProcessBook

Refinery starting page in Process book

Easy access to detailed production units screens via links in the display

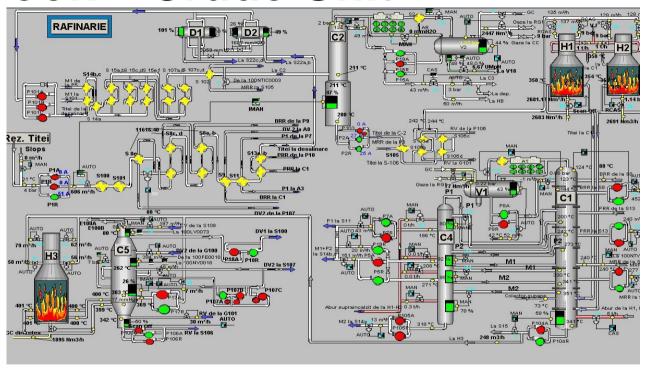




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## PI ProcessBook – Crude Unit

Detailed Crude Unit display with realtime parameter updates





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## Online Reports – Pl Datalink

## Production report in excel using PI Datalink

- Automated calculations for specific intervals
- Multiple sources aggregated
- Basis for further analysis

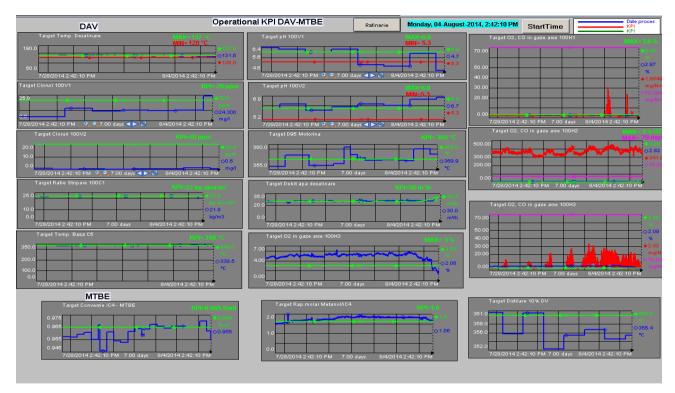
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2	8/ 8 / 4 /2014		()					-	RON	IPETRO	21		*
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8													
9	DAV	Sch.1	Sch.2	Sch.3	TOTAL	96	HPR	Sch.1	Sch.2	Sch.3	TOTAL	%	
10	SUPUS:		1478.954	0.000	5880.946	100.00	SUPUS:	2.204	1.406	0.000	3.610	100.00	
	Supus DAV	4401.992	1478.954	0.000	5880.946	100.00							
12													Distilat d
13	OBTINUT:	4401.992	1478.954	0.000	5880.946	100.00	Petrol DA	0.000	0.000	0.000	0.000	0.00	Distilat d
14	Gaze DA la V1(facla)	1.890	0.655	0.000	2.544	0.04	Petrol 1 DA	-1.256087458	-0.285728576	0	-1.541816034	-42.71	Distilat de
15	Gaze DA la V2-V3(180K2)	9.997	4.329	0.000	14.326	0.24	Motorina 1 CC	0	0	0	0	0.00	Gaze DA
16	Benzina 1 DA	271.059	91.420	0.000	362.479	5.15	Petrol 1 DA+ Motorina 1 DA	0.259755585	0.538349627	0	0.798105212	22.11	Gaze CX
17	Benzina 2 DA	336,687		0.000	453,823	7.72	Motorina 1 Cx	2.89556972	1.044044866		3.939614586	109.12	1
18		270,430		0.000	362,922	6.17	Hidrogen RC+Fabrici H2	0.305	0.109	0.000		11.48	Benzina
19		1101.926		0.000	1473,941	25.06	OBTINUT:	2.204	1.406	0.000	3.610	100.00	Benzina
20		1486.674		0.000	1988.382	33.81	Petrol reactor jet A1	0.000	0.000	0.000	0.000	0.00	Motorina
21	Reziduu de vid DA	908.512		0.000	1218.812	20.72	Motorina	0.000	0.000	0.000	0.000	0.00	Motorina
22	C.T.	14.819		0.000	3.716	0.06	Fractie usoara HPR	0.000	0.000	0.000	0.000	0.00	Cocs pe
23	QDA [m²/h]	635.051	617.906	0.000	3.710	0.00	Gaze cu H₂S HPR	0.489	0.175	0.000	0.664	18.40	TOTAL
24	ODV [m²/h]	263.297	255.694	0.000			Gaze cu H <sub>2</sub> HPR	0.000	0.000	0.000	0.000	0.00	Gaze DG
		38		0.000			C.T.	1.715	1.231	0.000	2.946	81.60	Propan C
		175					Qalim.[m²/h]	0.000	0.000	0.000	2.540	01.00	Propilena
27	Tinfl.mot. [°C]	71		-			Tinfl. hidrof.[°C]	0.000	0.000				Normal-E
28	S. petrol [%]	· //	,				TLF hidrof. [°C]		,				Iso-Buta
20		-13	, ,	-			CP [°C]	, ,	-	-			C.T.
30	Toong, mot DA [°C]	Sch.1		Sch.3	TOTAL	%			,				
31	SUPUS:	723.127	Sch.2 249,961	0.000	973.088		Cifra cetanica hidrof.	, ,	-	-			Qalim.(m
						100.00	Umiditate hidrof.[ppm]						Treactor
32		271.059		0.000	362.482	37.25	Sulf intrare [%]	, ,	,	-			Tregener
33	Benzina DA din rezervor	326.837	110.728	0.000	437.566	44.97	Sulf hidrofinat [ppm]		,	-			T138GV1
34	Benzina CX	89.479		0.000	123.989	12.74	Coroziune hidrof, Ag/Cu//	-		-			RON
35	Condensat de la 180K2	24.959		0.000	34.514	3.55	Tinfl. amestec [°C]	-	,	-			Sulf in be
36		10.792		0.000	14.537	1.49	TLF amestec [°C]	-	- ,				Coroziun
37	OBTINUT:	723.127		0.000	973.088	100.00	CP amestec [°C]	-	-,	-			Tf benzin
38		386.059		0.000	520.378	53.48	Cifra cetanica amestec			-			TVR [Kpa
39	Fractie C2-C5 HB	102.878		0.000	137.594	14.14	Umiditate amestec [ppm]	- [		-			RSH [ppi
10		198.777	68.162	0.000	266.939	27.43	Lubricitate amestec [qm]	- [	-	-			Sedimen
11	Gaze cu H2S HB-la HPM	13.596		0.000	18.326	1.88	Sulf intrare amestec[%]	-[	-[,				% propa
12		6.962		0.000	9.610	0.99	Sulf amestec [ppm]	-[	-[	-			%izobutil
13	C.T.	14.855		0.000	20.241	2.08	Coroziune/Cu	-	-(	-			%izobuti
14	Qalim.[m³/h]	133.742		0.000			Tinfl. petrol hidrof.[°C]	-	-[	-			Sulf total
45	T [°C]	287	287	-			Conductivitate [ps/m]	-	-[	-			QCO-boil
46		39.915	39.956	-			Sulf petrol reactor [ppm]	-	-[	-			QCO-boil
17	Sulf [ppm]						RSH [ppm]/aditivi						OFE3 [t/



## **KPI's**

#### KPI screen in PI Process Book

Realtime
 monitoring of
 important
 indicators (yields,
 consumptions,
 energy efficiency)





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## From the past to the future

2004

BEFORE PI IMPLEMENTATION	AFTER PI IMPLEMENTATION				
COLLECTING DATA = TIME CONSUMING ACTIVITIES	MORE TIME FOR ANALYSES				
LIMITED HISTORY	LONG TIME DATA HISTORY				
DELAY BETWEEN THE FACTS AND FEEDBACK	REAL TIME INFORMATION, REAL TIME ACTIONS				
A HUGE MANUAL DATA INPUTS FOR REPORTS	HIGH QUALITY DATA INPUTS FOR REPORTS				
ERRORS on NUMBERS	ACCURATE DATA				
LIMITED DATA ACCESS	HIGH DATA AVAILABILITY				



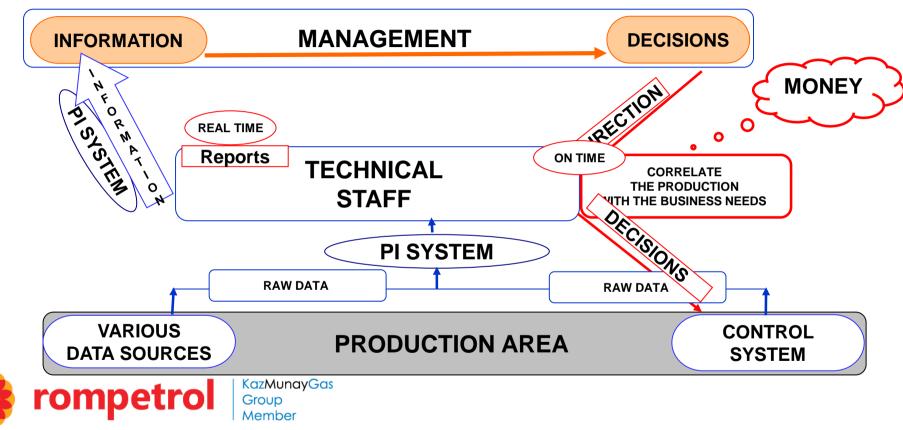
KazMunayGas Group Member DATA from PI SYSTEM
=
QUALITY, AVAILABILITY, INTEGRITY
REAL TIME

## The Future of PI

- Upgrade to PI 2012
- •Reduction of time to access the information by configuring the tags grouped by assets.
- •Faster response time in case of parameter deviations by real time notifications to responsible people PI Notifications
- Define and monitor of complex performance indicators
- Increased automation of reporting processes
- •Provide the tools for deeper insight into plant operations with PI Analytics suite: PI Advanced Computing Engine (PI ACE), PI Statistical Quality Control (PI SQC).



## **Conclusions**



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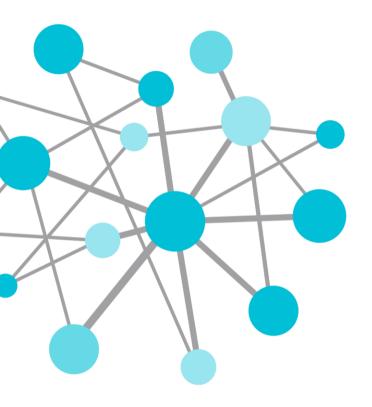
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# THANK

