PI System Case Studies in the Cement Industry

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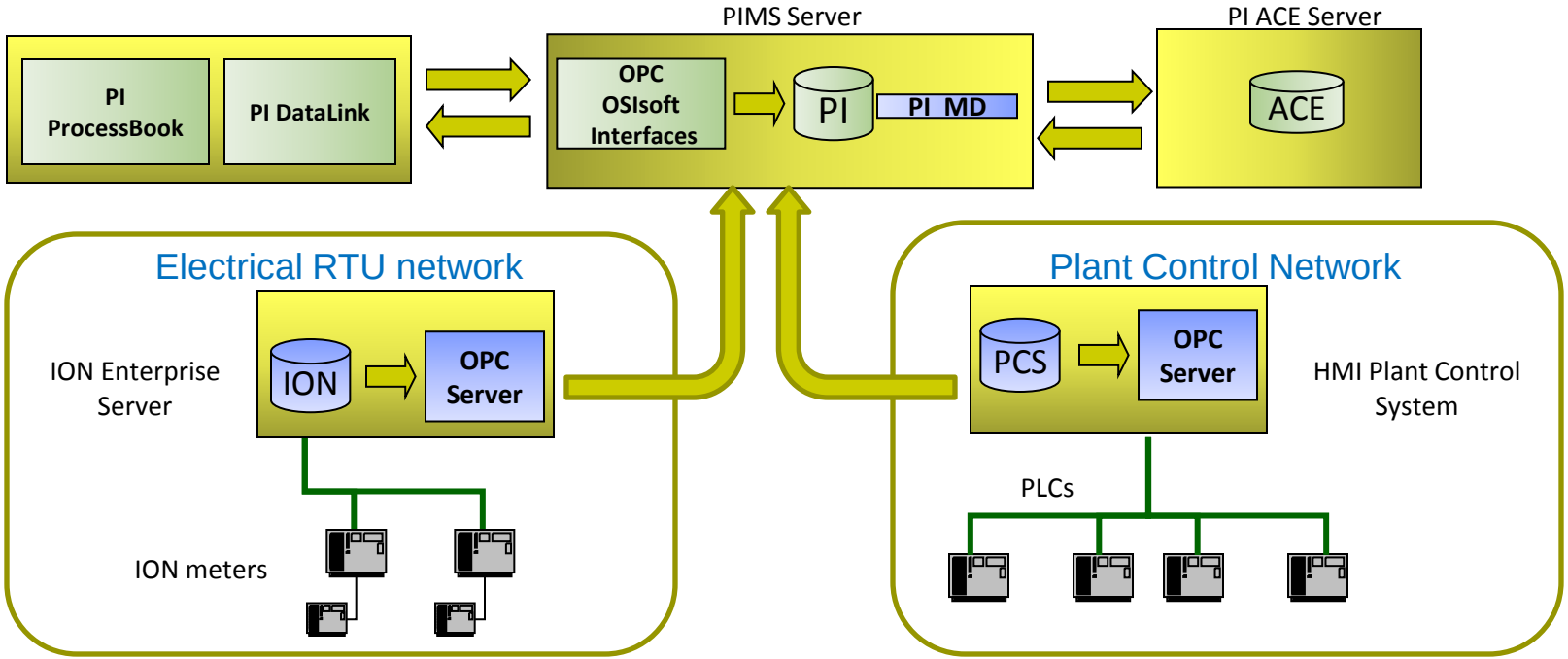
OSIsoft

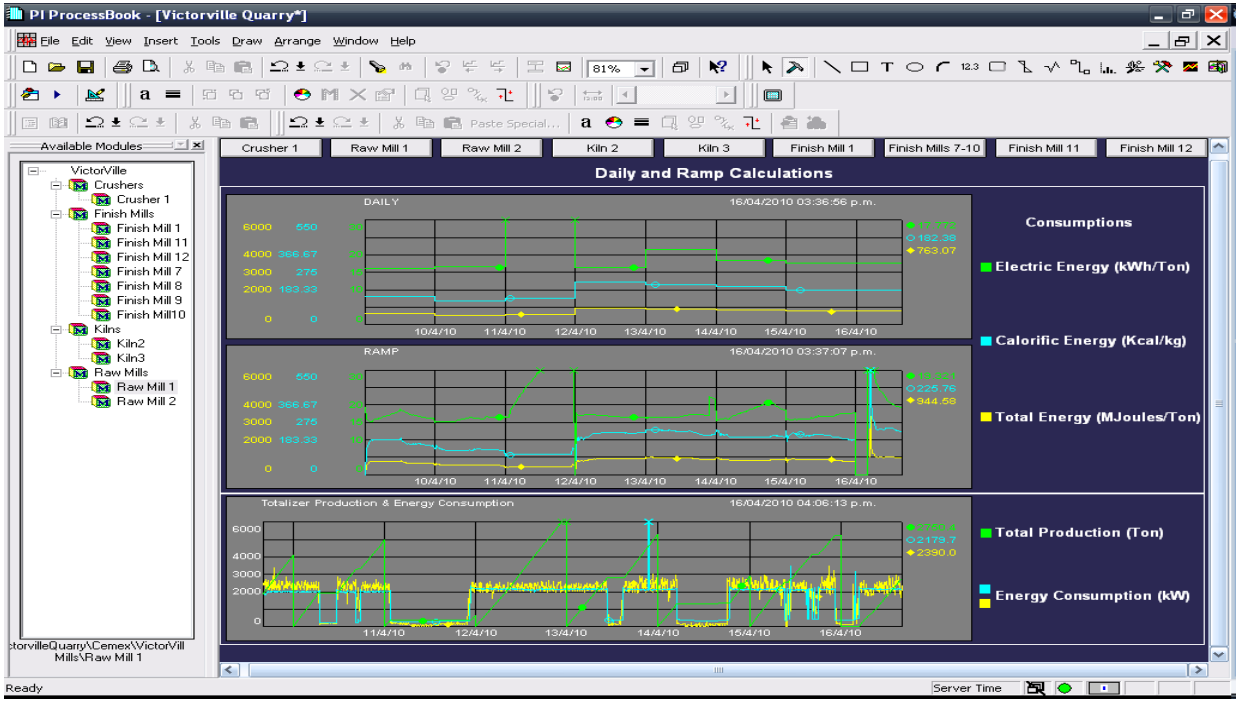
ENERGY

Solution Architecture Diagram



ENERGY

PB Displays Examples



ENERGY

Results & Benefits

- Enhanced online detailed view of energy consumption
- Reduction in the use of fossil fuels
- Cost reductions in the use of energy (cost estimation being evaluated)
- Project applicable for carbon credits
- Easy replication in other facilities

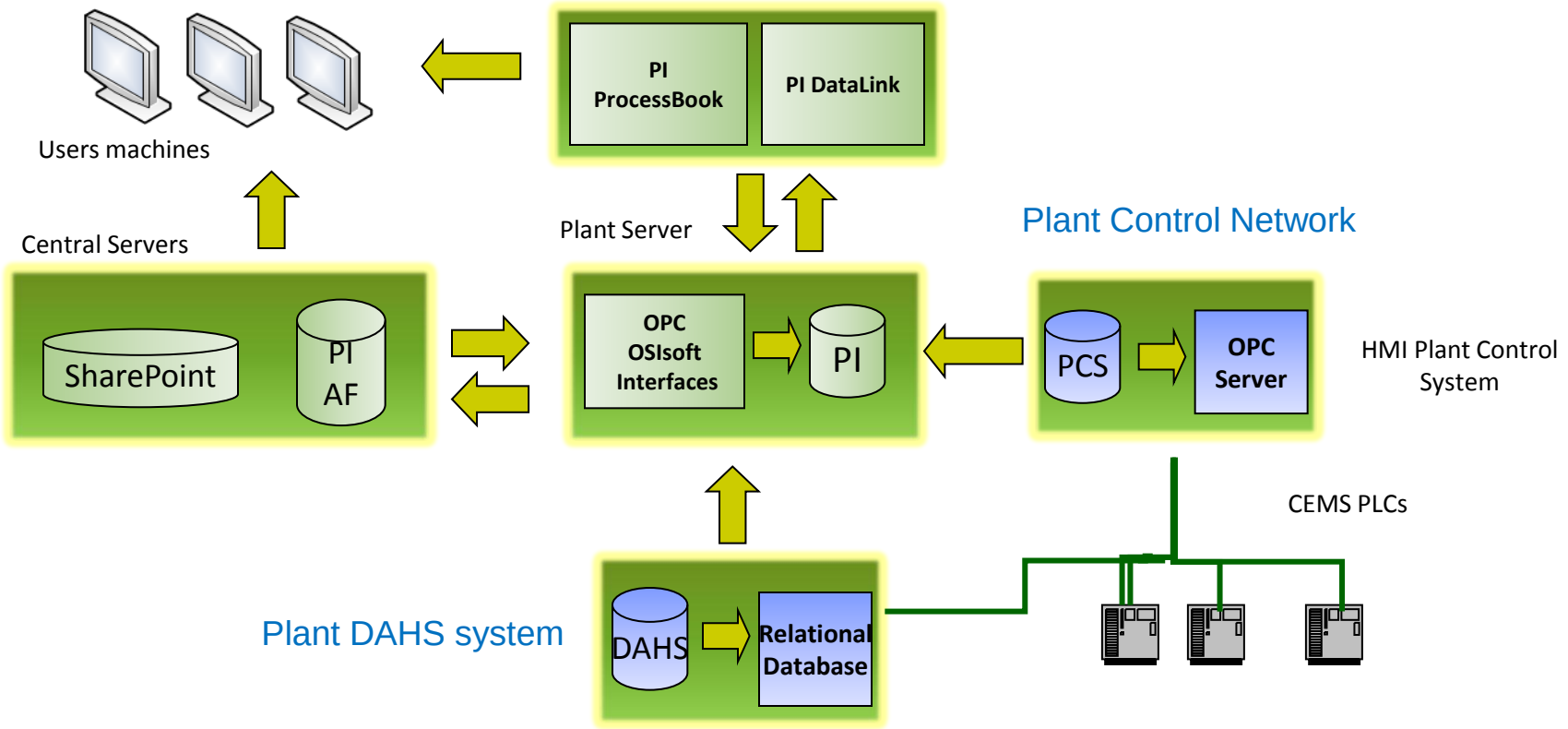
Emissions

As part of the company's cost reduction strategy, it decided to replace the current Emissions Monitoring System with the actual Plant Information Management System (PIMS) to reduce the TCO. PIMS is based in PI Server, PI AF, PI WebParts, PI DataLink and PI SDK.

The company has decided to decommission the usage of an existing environmental reporting system for keeping in compliance with Federal and Local environmental agencies.

The company needed to pay an annual fee for being able to use the current environmental reporting system, this annual fee is paid by each cement plant that uses this reporting system.

Emissions



Emissions

Results

- Data is available from a common and easy to use platform, and most importantly the data is hosted inside the company's network.
- All needed information for environmental reporting is consolidated on the PI server, and this helps the integration and easy access to data in only one place.
- All environmental information is scalable to different levels at the organization from Excel reports using PI DataLink to internal websites using PI WebParts.
- We have more reliable ways to present just one version of the truth by using the different tools from the PI platform.

Emissions

Tangible benefits

- CEMEX will be saving 20K USD on annual fees, per each location where the former environmental reporting system is being used, that means around 220K USD in total savings (per year) for the 11 cement plants in the USA.
- Therefore, we can reduce the TCO in the Environmental department for having/maintaining an in-house reporting system.

Emissions

Intangible benefits

- We are extending the usage of our PI platform to other departments, other than Cement Operations, by stimulating the usage of the PI platform in the company, and taking advantage from our EA with OSIsoft.
- We have started a way to standardize the development of reports needed at our cement plants.
- End users are discovering different ways where PI can help to add value in different areas of the company.

QUALITY

Quality

Integrate Quality Lab Equipment to PIMS and develop new functionality in order to replace actual Institutional Quality Systems.

- Analyze and evaluate alternatives to integrate Quality information on a single infrastructure and replacing Quality Legacy applications functionalities such as:
  - ✓ Data extraction (interface)
  - ✓ Manual Input
  - ✓ Plant Configuration
  - ✓ Reports
  - ✓ Quality Assurance Margin indicator
  - ✓ Interfaces to another systems

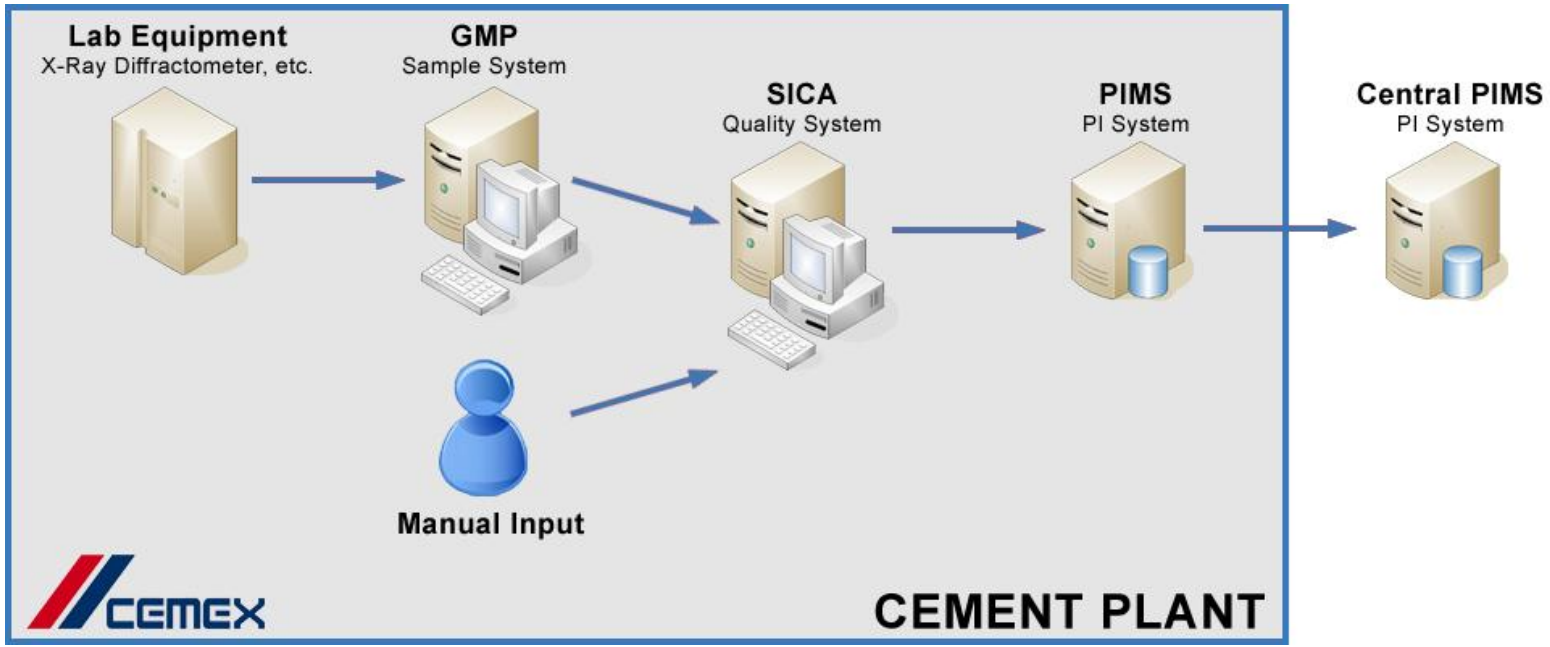
Replacing these functionalities allows CEMEX to reduce **TCO** costs, by eliminating actual Quality Systems expenses like:

- ✓Application Support
- ✓Hardware Maintenance
- ✓Software Upgrades

QUALITY

Quality

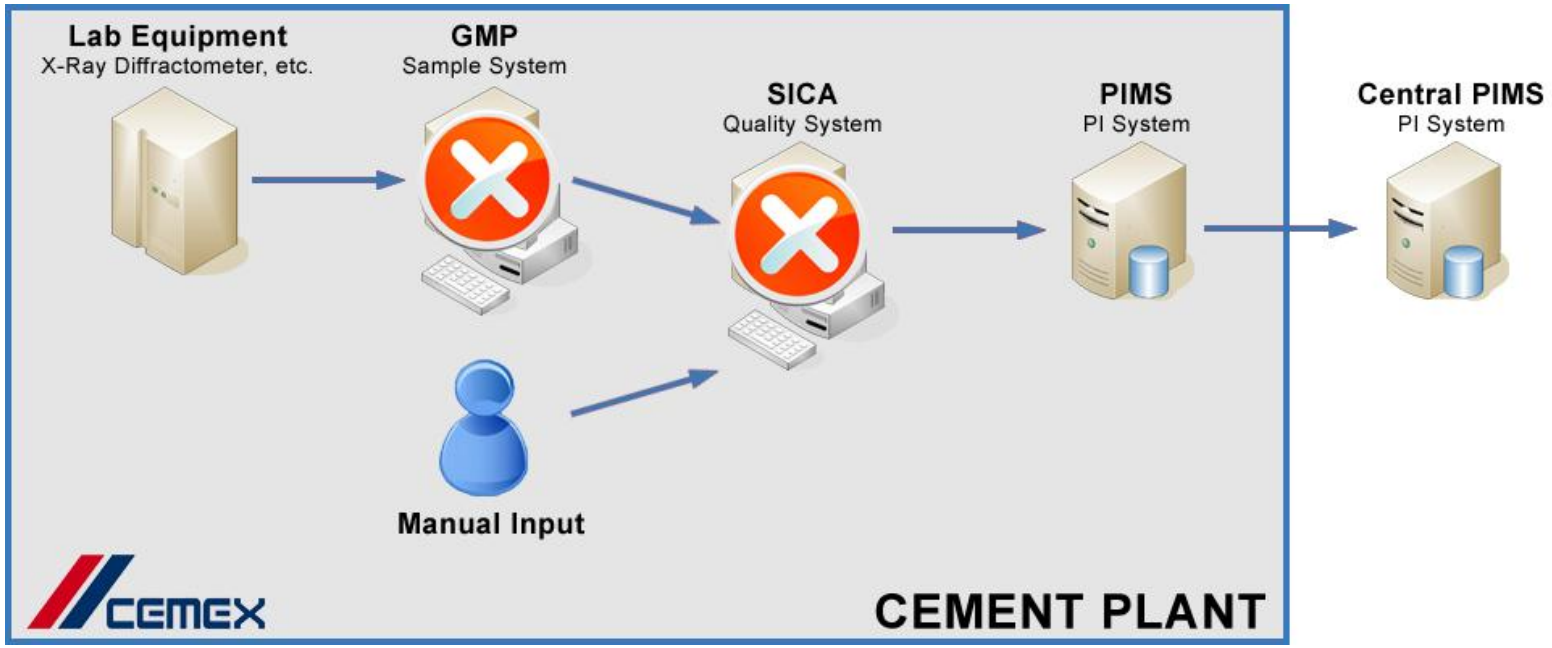
Solution Architecture



QUALITY

Quality

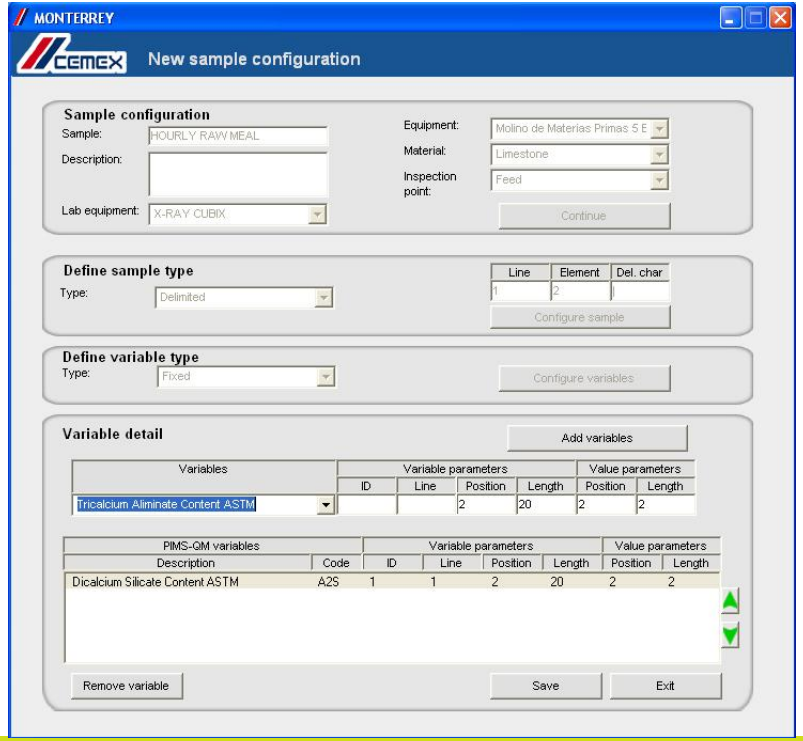
Solution Architecture



QUALITY

Quality

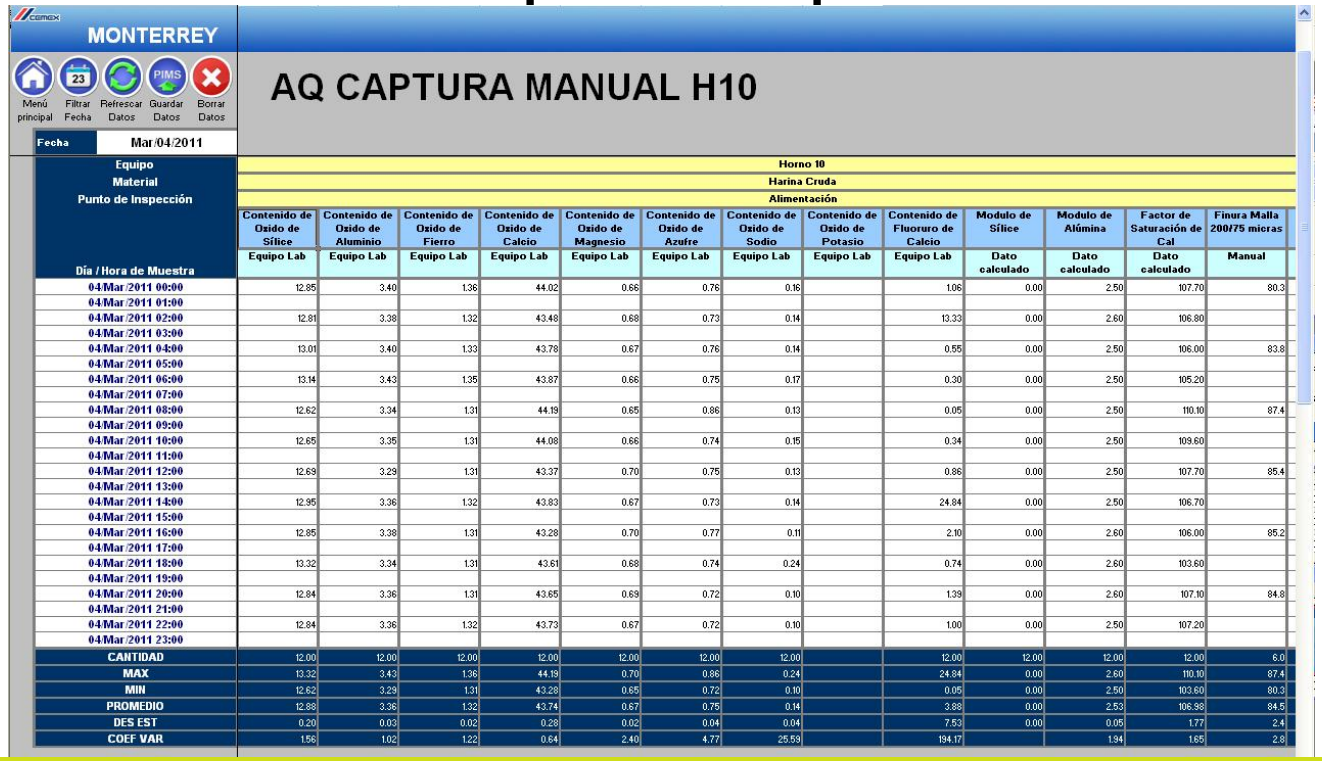
Lab Equipment Interface Configuration



QUALITY

Quality

Data Acquisition Report



MONTERREY

Menú principal | Filtrar Fecha | Refrescar Datos | Guardar Datos | Borrar Datos

AQ CAPTURA MANUAL H10

Fecha: Mar/04/2011

Equipo / Material / Punto de Inspección	Horno 10 / Harina Cruda / Alimentación												
Día / Hora de Muestra	Contenido de Oxido de Sílice	Contenido de Oxido de Aluminio	Contenido de Oxido de Fierro	Contenido de Oxido de Calcio	Contenido de Oxido de Magnesio	Contenido de Oxido de Azufre	Contenido de Oxido de Sodio	Contenido de Oxido de Potasio	Contenido de Fluoruro de Calcio	Modulo de Sílice	Modulo de Alúmina	Factor de Saturación de Cal	Finura Malla 200/75 micras
	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Equipo Lab	Dato calculado	Dato calculado	Dato calculado	Manual
04/Mar/2011 00:00	12.85	3.40	1.36	44.02	0.66	0.76	0.16		1.06	0.00	2.50	107.70	80.3
04/Mar/2011 01:00													
04/Mar/2011 02:00	12.81	3.39	1.32	43.48	0.68	0.73	0.14		13.33	0.00	2.60	106.80	
04/Mar/2011 03:00													
04/Mar/2011 04:00	13.01	3.40	1.33	43.78	0.67	0.76	0.14		0.55	0.00	2.50	106.00	83.8
04/Mar/2011 05:00													
04/Mar/2011 06:00	13.14	3.43	1.35	43.87	0.66	0.75	0.17		0.30	0.00	2.50	105.20	
04/Mar/2011 07:00													
04/Mar/2011 08:00	12.62	3.34	1.31	44.19	0.65	0.86	0.13		0.05	0.00	2.50	110.10	87.4
04/Mar/2011 09:00													
04/Mar/2011 10:00	12.65	3.35	1.31	44.08	0.66	0.74	0.15		0.34	0.00	2.50	109.60	
04/Mar/2011 11:00													
04/Mar/2011 12:00	12.69	3.29	1.31	43.37	0.70	0.75	0.13		0.86	0.00	2.50	107.70	85.4
04/Mar/2011 13:00													
04/Mar/2011 14:00	12.95	3.36	1.32	43.83	0.67	0.73	0.14		24.84	0.00	2.50	106.70	
04/Mar/2011 15:00													
04/Mar/2011 16:00	12.85	3.38	1.31	43.28	0.70	0.77	0.11		2.10	0.00	2.60	106.00	85.2
04/Mar/2011 17:00													
04/Mar/2011 18:00	13.32	3.34	1.31	43.61	0.68	0.74	0.24		0.74	0.00	2.60	103.60	
04/Mar/2011 19:00													
04/Mar/2011 20:00	12.84	3.36	1.31	43.65	0.69	0.72	0.10		1.39	0.00	2.60	107.10	84.8
04/Mar/2011 21:00													
04/Mar/2011 22:00	12.84	3.36	1.32	43.73	0.67	0.72	0.10		1.00	0.00	2.50	107.20	
04/Mar/2011 23:00													
CANTIDAD	12.00	12.00	12.00	12.00	12.00	12.00	12.00		12.00	12.00	12.00	12.00	6.0
MAX	13.32	3.43	1.36	44.19	0.70	0.86	0.24		24.84	0.00	2.60	110.10	87.4
MIN	12.62	3.29	1.31	43.28	0.65	0.72	0.10		0.05	0.00	2.50	103.60	80.3
PROMEDIO	12.88	3.36	1.32	43.74	0.67	0.75	0.14		3.88	0.00	2.53	106.98	84.5
DES EST	0.20	0.03	0.02	0.28	0.02	0.04	0.04		7.53	0.00	0.05	1.77	2.4
COEF VAR	1.56	1.02	1.22	0.64	2.40	4.77	25.59		194.17		1.94	1.65	2.8

QUALITY

Results using PI System features

- Single Platform for Quality and Production data
- Standardization
- Real-time Quality KPI’s
- Faster data gathering process
- Enhanced data security
- Easy corporate consolidation
- Cross business visibility

QUALITY

Intangible Benefits

Results using PI System features

- Keep quality practices standardized
- Business unit benchmarking
- Production and quality data correlation
- Integrate X-ray equipment from different vendors
- Eliminate risk of technology obsolescence
- Easy integration with company ERP (SAP)

QUALITY

Results Phase 1 - Deployment (14 plants in Mexico)

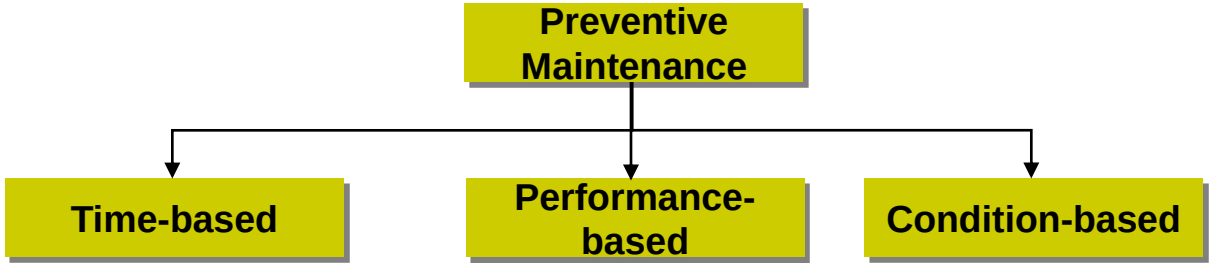
Tangible Benefits

- Reduce TCO of previous in-house system by USD $ 800 k/year approx.
- Calculated ROI is 6 months
- No extra cost for OSIsoft licenses, all are included in the Enterprise Agreement

MAINTENENCE

Maintenance

Improve assets utilization and reduce maintenance costs by providing indicators and trigger tags for preventive maintenance based on performance and operation conditions. Integrate process control data from the main equipment to calculate tags that trigger automatically work orders for preventive maintenance through the ERP.



IMPLEMENTED USING PI Notifications

MAINTENENCE

Benefits

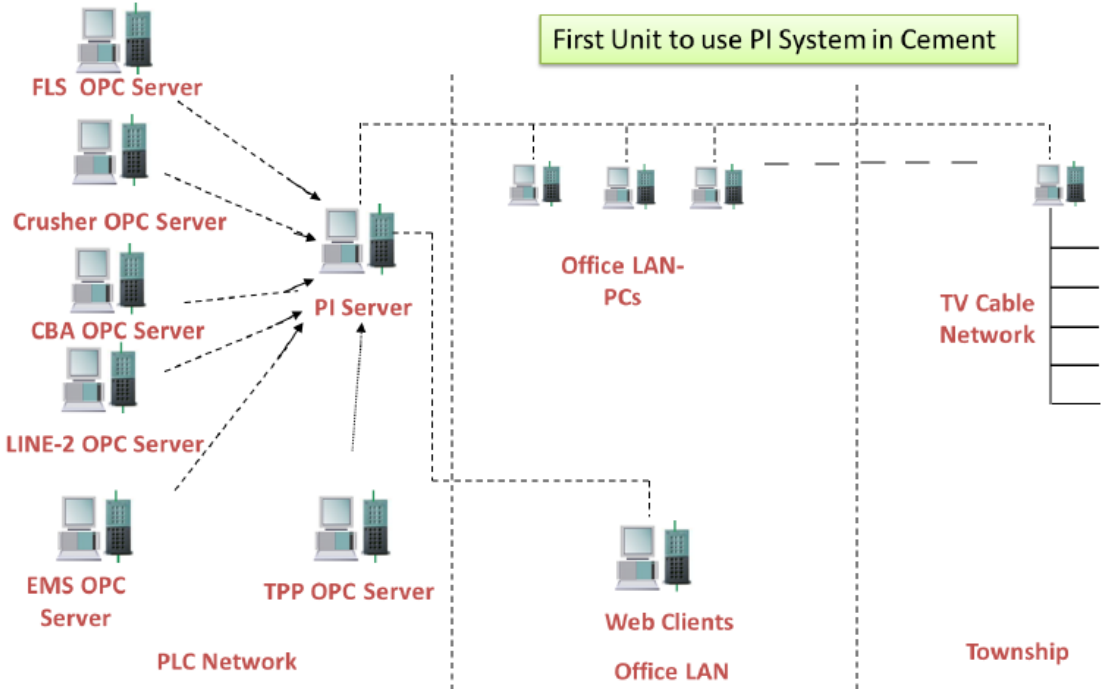
- Reduced maintenance engineers effort and time to manual input equipment run hours at ERP.
- Empowered preventive maintenance routines based on automatic run hours input.
- Improved resources costs increasing preventive maintenance instead of corrective maintenance (decreasing spare parts requirements and increasing maintenance engineers available time for analysis).

PI Data to ERP (SAP)

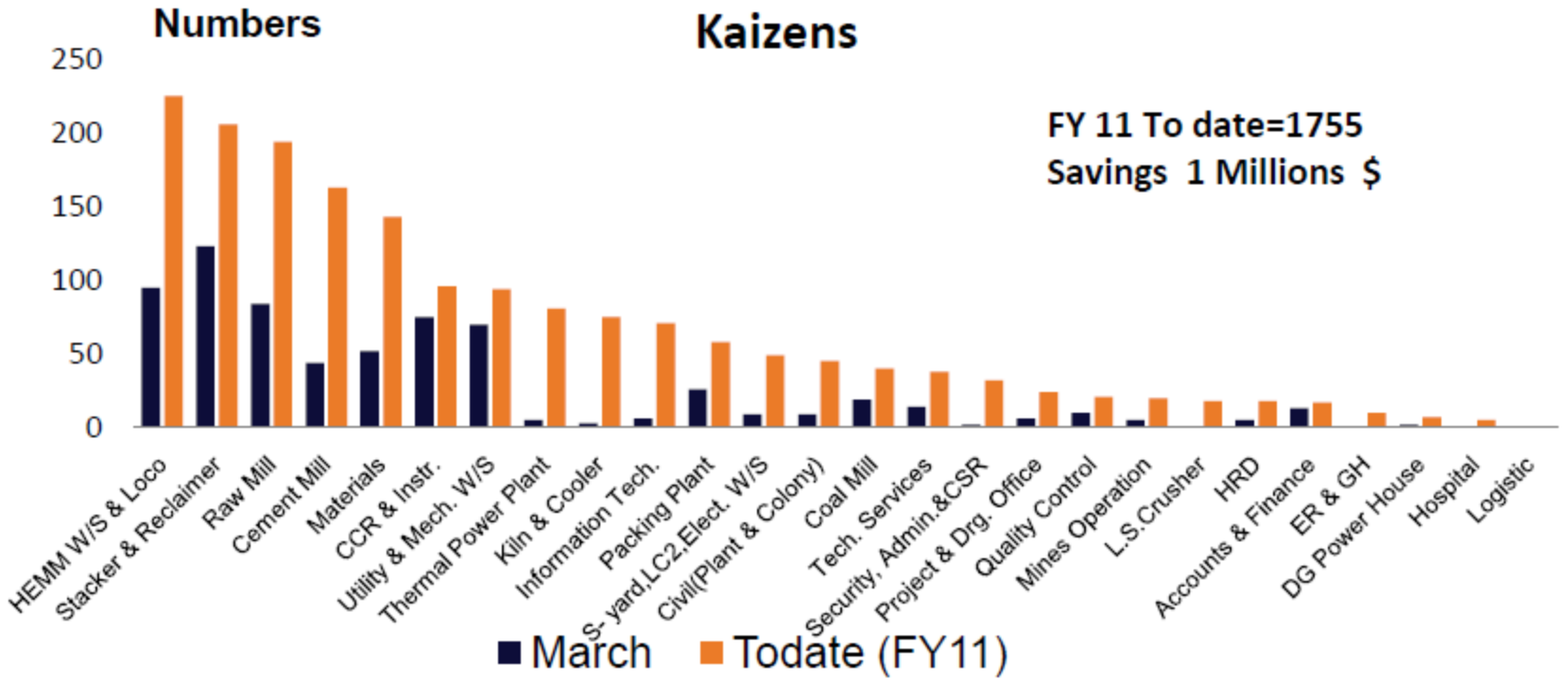
Benefits

- Automated and validated data transfer to the ERP.
- Real-Time operational indicator interaction between PI and SAP
- Ability to have tighter inventory control and automated work orders
- Up-to-date data for enterprise wide decisions

PI System Architecture at UltraTech Cement Ltd. Aditya Cement Works Shambhupura



Improvement Cases at Aditya Cement



Results and Performance Data

THANK YOU

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