Welcome to the
O&G & Industrial Chemicals
Industry Tract

감사합니다

谢谢

Danke

Gracias

Merci

Thank You

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Спасибо

Obrigado

Köszönöm!

Děkuji

Today's Agenda

- Welcome and Introductions

- Agenda and Customer Presentations Overview

- Keynote – Energy's New World

- Customer Presentations

- Closing Comments

Oil and Gas - Industry Principals

Upstream

Midstream

Hydrocarbon Processing

Industries(HPI)

Cindy Crow

Michael Graves

Craig Harclerode

Speakers and Topics

9:00	9:20	Introductions and Keynote	OSIsoft
9:20	9:50	The PI System: An Essential Pillar for MES and Operational Intelligence	Omnia Fertilizer
10:00	10:30	The Journey to an Integrated Refinery Information System	INA
10:30	11:00	Break	
11:00	11:30	Business Intelligence Solutions in PI Asset Framework	MOL Plc.
11:40	12:10	Diverse Requirements, One Platform	PetroSA
12:10	2:00	Lunch	
2:00	2:30	Reducing Reserved Daily Natural Gas Capacity through Operational Intelligence	MOL Nyrt.
2:40	3:10	Operational Intelligence: Real-time Data Supporting Real-time Production Optimization	BG Group
3:10	3:40	Break	
3:40	4:10	Optimizing Natural Gas Compression, Storage and Quality with the PI System	Columbia Pipeline Group
4:20	4:50	Diversity of the PI System in EMEA Midstream	OSIsoft
4:50	5:15	Wrap-Up and Closing Comments	OSIsoft

Using the PI System in O&G & Industrial Chemicals to Deliver Business Value in the 21st Century

Energy's New World

Energy's New World.....

When written in Chinese, the word 'crisis' is composed of two characters, one represents danger, and the other represents opportunity. [Saul David Alinsky]

If you always do what you always did, you will always get what you always got. [Albert Einstein]

Operational intelligence enabled by the PI System is your opportunity to respond to the "crisis" of today with innovation by using the capabilities fully to enable transformation...this is not your "Mothers PI"

The Journey to Enterprise Intelligence – IT/OT Convergence

Michael Graves, OSIsoft

OT Context Infrastructure - Foundational for Operational Intelligence & Excellence

Sensor Data Sources With Metadata

- Mobile
- Meter
- Car
- Equipment
- Event
- RFID
- Etc.

Intermediary Data Sources & 1st Level Calculations & Analytics

- IoT Cloud Based Hub
- IoT Head End Concentrator
- Manual Data Entry
- Local Historian (PLC/SCADA/DCS)
- Relational Data

Asset Based OT Context & Abstraction Infrastructure

Cloud Enabled, High Availability

?

Dashboards & Operational Analytics

Mobility and Self Serve BI

MetaData/System integration Maximo/P&S/LIMS/Etc.

Dashboard drilldown to detailed reports

Tyler Asset Performance

El Dorado Refinery KPI Scorecard

Regional Product Inventories

Driving Continuous Improvement

- Content
- Organizational Insight
- Access
- Personal Analytics & Assessment
- Collaborative Intelligence
- Windows, iOS and Android Apps
- Data with Context
- Operational Awareness
- Action

The PI System as an Enterprise OT Data Infrastructure

Data aggregation, quality & normalization. Foundation for Calculations, Analytics, Visualization, Dashboards/KPIs, Mobility, & Reporting

Calculations & Analytics

Visualization

Dashboards

Mobility
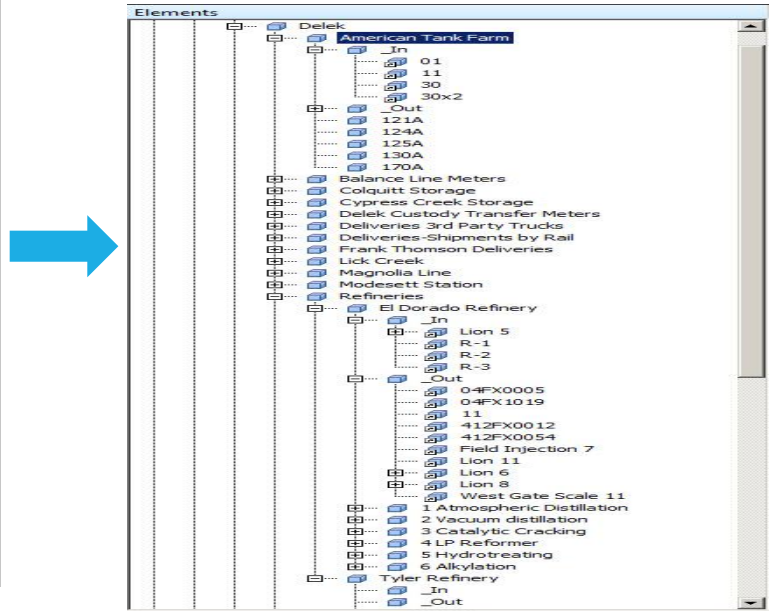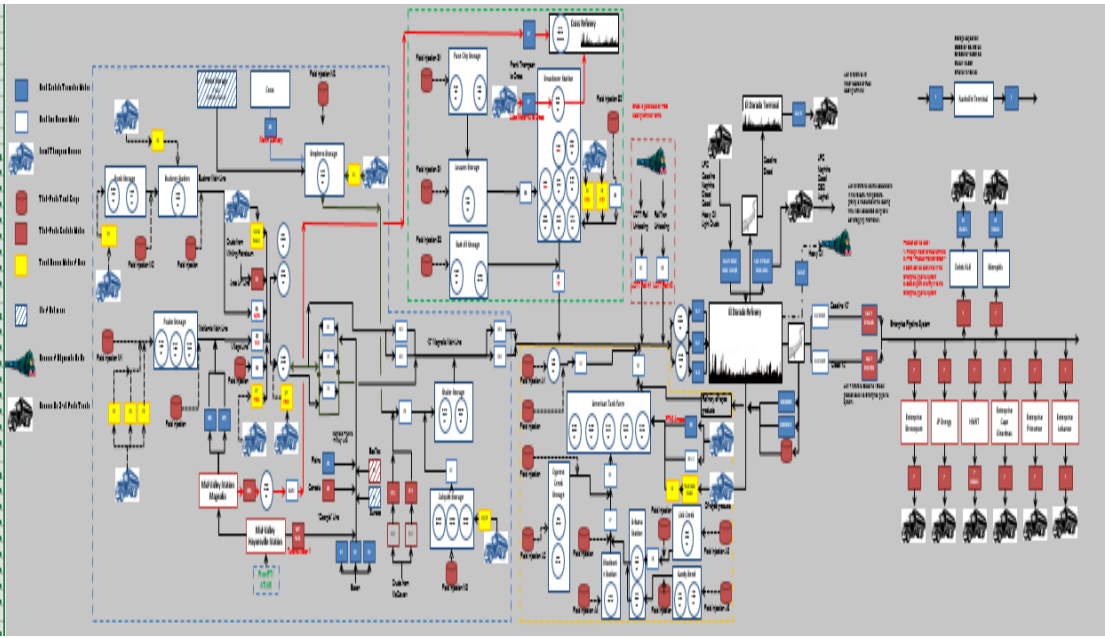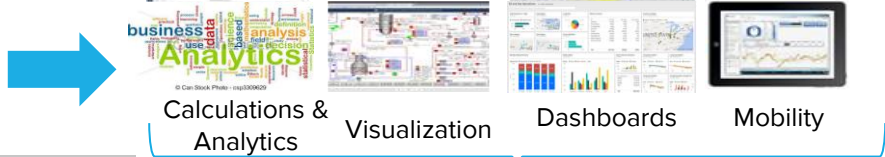
Asset, Plant, "System", or Enterprise

OT Data Model

Value Prop for Migrating from Tag/Excel to Asset/Web

1. **Inconsistency** in analytics/calculations
2. **Tag based**
3. **Static** analytics/calculations
4. **Limited Trending & Visualization**
5. **Local Ownership**

1. **Consistency** in analytics/calculations
2. **Asset based**
3. **Dynamic, real-time** analytics/calculations
4. **Powerful, flexible** Trending, Visualization. Events, alerts
5. **Web based** access and collaboration

Individual Spread sheets

Excel (**calculations, analytics**, reporting, Visualization)

Manual Data Entry & table lookup

Multiple Apps & Solutions

Other Systems
Calculations, analytics
Visualization, reporting

Excel Services
Visualization/
Reporting (Web)

PI Coresight (Web)

Web/ Mobility

Other Systems

Other Systems
Visualization, reporting

"Historian"
(Tag Based)

PI System
(Asset Based)
Calculations, analytics

Manual Data Entry & table lookup & Metadata

Data Sources
(DCS/SCADA/PLC, etc).
Non-control Calculations

Data Sources
(DCS/SCADA/PLC, etc.)

Reducing $/BOED by Organizational Transformation with PI AF

"PI AF underpins our analytics and visualization by providing a secure, normalized asset based data structured that simplified the development and support of our integration, analytics, applications, and visualization enabling enhanced collaboration."
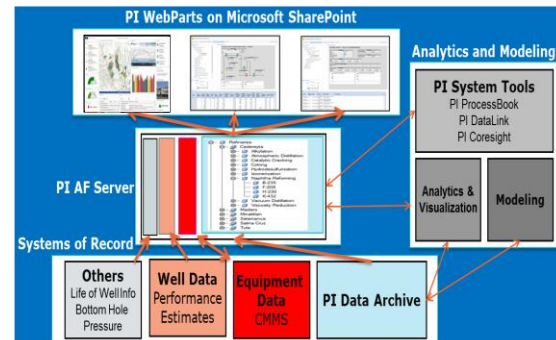
Ernest Garner and Tara Willis, Automation Analysts, GOM

Chevron

SF UC2014

CHALLENGES

Diverse, tag based data structure inhibited collaboration and complicated integration and applications management

- 3+M tags with diverse naming from 29 offshore DCS "historians", 650 assets
- Tag based applications and solutions portfolio...Massive "spider web"
- Issues with security, performance, and reliability of off shore data transmission

SOLUTION

Secure and normalized asset based data integration, applications, and visualization

- PI Infrastructure extended to the offshore assets for security and performance improvement
- GOM asset data object model used for integration and application simplification
- Migrated all analytics, visualization, and collaboration to the PI AF data model

RESULTS

Improved operational performance from enhanced collaborative decision support

- Significant reduction in OPEX
- Improved production from asset availability
- Improved collaboration and teamwork

OT Context Infrastructure and Abstraction Layer

PI WebParts on Microsoft SharePoint

Refresh Custom Application

Analytics and Modeling

PI System Tools
PI ProcessBook
PI DataLink
PI Coresight

PI AF foundation for all data and information used for integration, analytics, and visualization

Standardized PI Points

[Asset Code]_[Well Name]_[Medium]_[Tag Bits].[Type Code]

InstrumentTag

Analytics & Visualization

Modeling

PI A...

Systems of...

Others
Life of Well Info
Bottom Hole Pressure

Well Data
Performance Estimates

Equipment Data
CMMS

PI Data Archive

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$500M-550M EBITDA improvement

MOL (Global Integrated O&G Company – Hungary)

"Installing the PI System infrastructure across our fuels value chain was fundamental to our New Downstream Program and the significant performance and sustainability improvement we have seen."
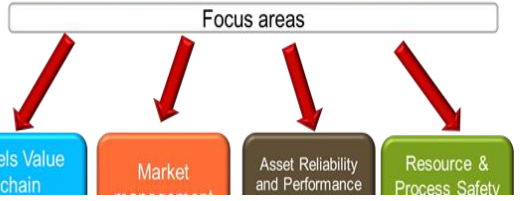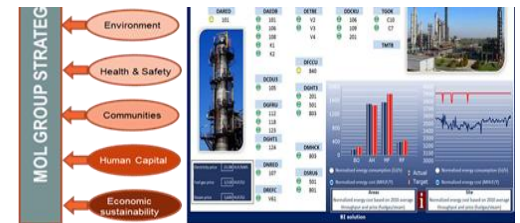
Tibor Komróczki Head of Process Information & Automation

EMEA UC2015

CHALLENGES	SOLUTION	RESULTS
Need to significantly improve performance of a portfolio of 6 refineries & related value chain	Implemented a "New Downstream Program – NDSP" based on a new data and information PI System centric strategy	Significant Improvement in the fuels value chain performance in all key areas – energy, reliability, safety, & compliance
• Low cultural alignment, standardization, and use of best practices	• Installed the PI Systems across the full value chain	• Increased Yield – 5%
• limited data based and proactive decision making	• Developed new PI System based applications in critical areas including energy & reliability	• Decreased energy consumption – 2% YOY
		• Reduced HC loss: -30%
		• Utilization: 1.1%

MOL Downstream AF Based Applications

- Interlock statuses
- Operating envelopes
- Alarm management
- Energy KPI breakdown (6 tiers)
- Column Dashboards
- Normal mode of control loops
- APC monitoring
- 1st & 2nd Level material balancing
- Sigmafine (PI AF) used for yield accounting

- Energy Monitoring
- CH, Utilities and Energy balances
- Flare activities
- Corrosion control
- Crude Blending Control
- Natural Gas and Fuel gas forecasting
- Control rooms' temperature
- Yield Optimization/Reporting
- Plan vs Actual (PvA) Analytics

Improving Asset Integrity with Advanced Corrosion Predictive Analytics

- High Temperature Hydrogen Attack (HTHA)

- f^x (metallurgy, temperature, hydrogen partial pressure(PP), length of exposure)

- Developed PI AF template that:
  - Determine partial pressure
  - Attribute of pipe class
  - Temperature and length of exposure limits
  - Total time above Temp and PP
  - Alerts/notification/event frame

- Tested and rolled out in 6 units < 1 week
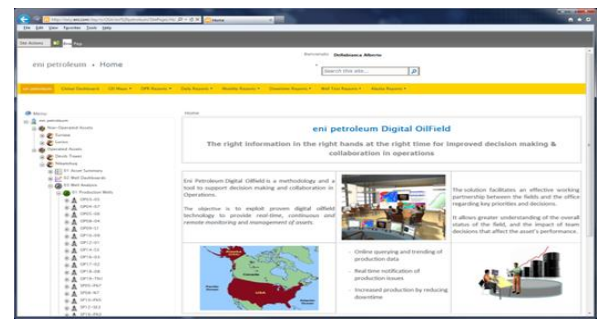
- Expanding to all plants in 2015.
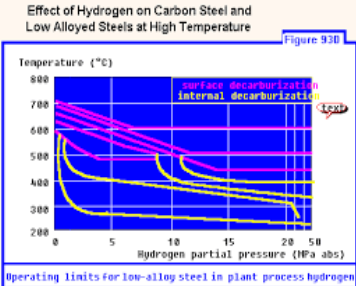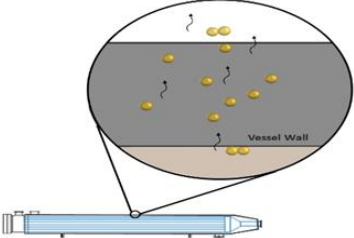
Improved DOF Decision Making with PI AF

ENI Global E&P

"PI AF is the foundation of our Digital Oil Field program enabling quicker decision making, early detection of potential issues, & identification of optimization opportunities".

Alberto Dellabianca, DOF Advisor

[SF UC2015](SF UC2015)

CHALLENGES

Business environment demanding faster, more proactive decision making, lower costs, and improved scale and pace of DOF program.

- Diverse E&P assets and systems
- Lack of standardization
- Reactive, sub optimal decision making resulting in lost production, higher costs, and increased risk.

SOLUTION

Use of PI AF and PI Analytics as foundation to the DOF program

- PI System infrastructure extended across all E&P assets and operations
- Installed PI AF collectives on all major production assets
- Leveraged PItoPI for improved data quality, reliability, and security
- Developed E&P Global AF data object model with extensive use of templates.
- Leveraged PF Analytics (Extensively)

RESULTS

Significant improvement in preventable lost production, lifting cost reduction, and reservoir optimization.

Estimated results in the areas of:

- Lost production
- Lifting cost reduction
- Improved critical asset reliability
- Improved reservoir performance

System Architecture

ENI HQ WEB PORTAL FOR ALL AFFILIATES WORLDWIDE

Sharepoint Collaboration | PI Coresight Analysis | GeoDashboard | OVS Reports | Mobile View

AF Global Template Repository

AF

EMAIL

OVS Integration & Automated Workflows™

PI Data Server

Production Accounting

Simulation Tools

Field | Field | Field | Field | Field

Manual Input

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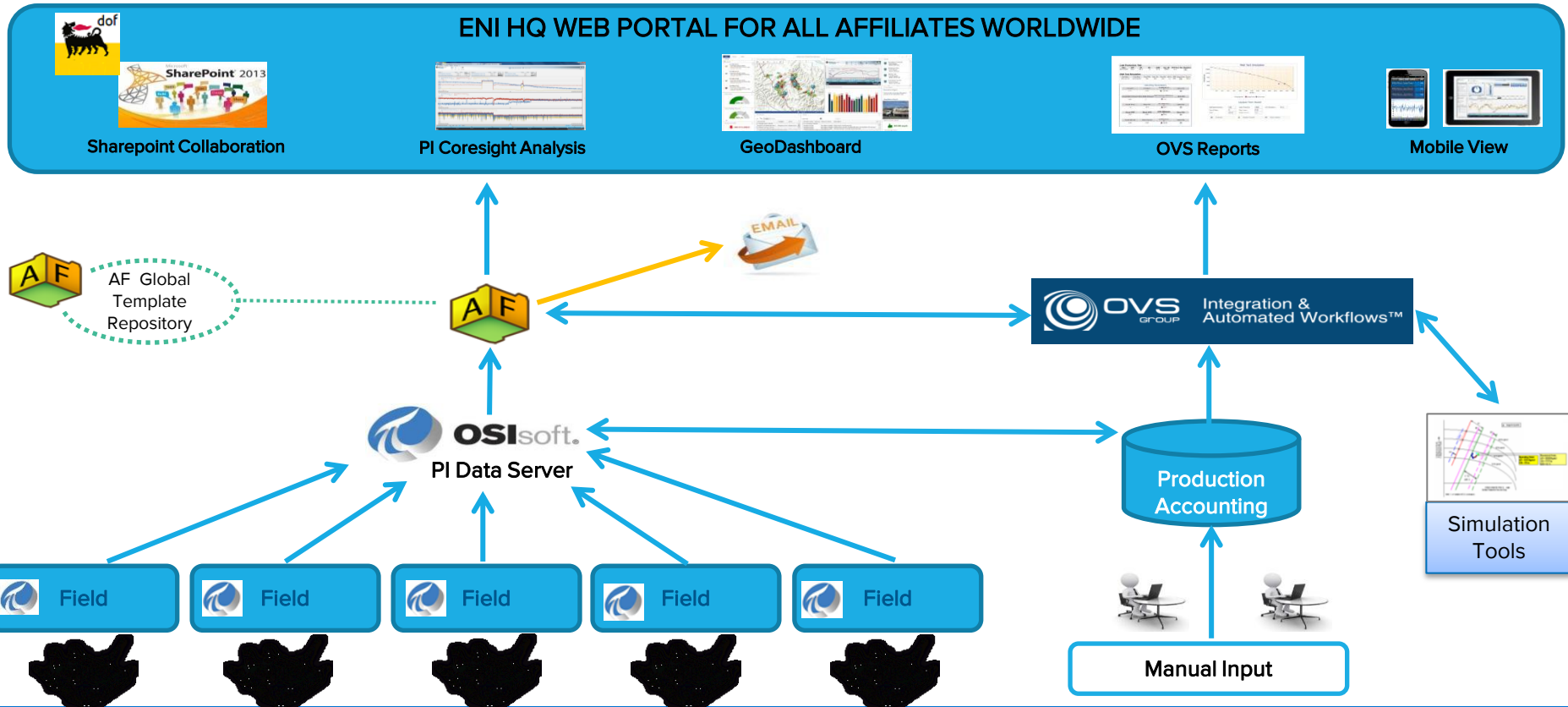
Most Advanced Refinery in the World
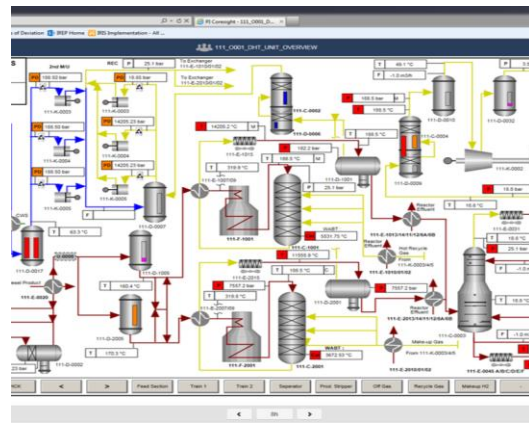
YASREF (Yanbu Aramco Sinopec refinery JV)

"Selecting the PI System and EA early supported a smooth refinery start up and set the foundation for an integrated, collaborative data based decision making culture that supports YASREFs vision of being the most advanced refinery in the world by 2020."

Mahmoud M. Madani, IRIS Lead Project Engineer

Yasref

SF UC2015

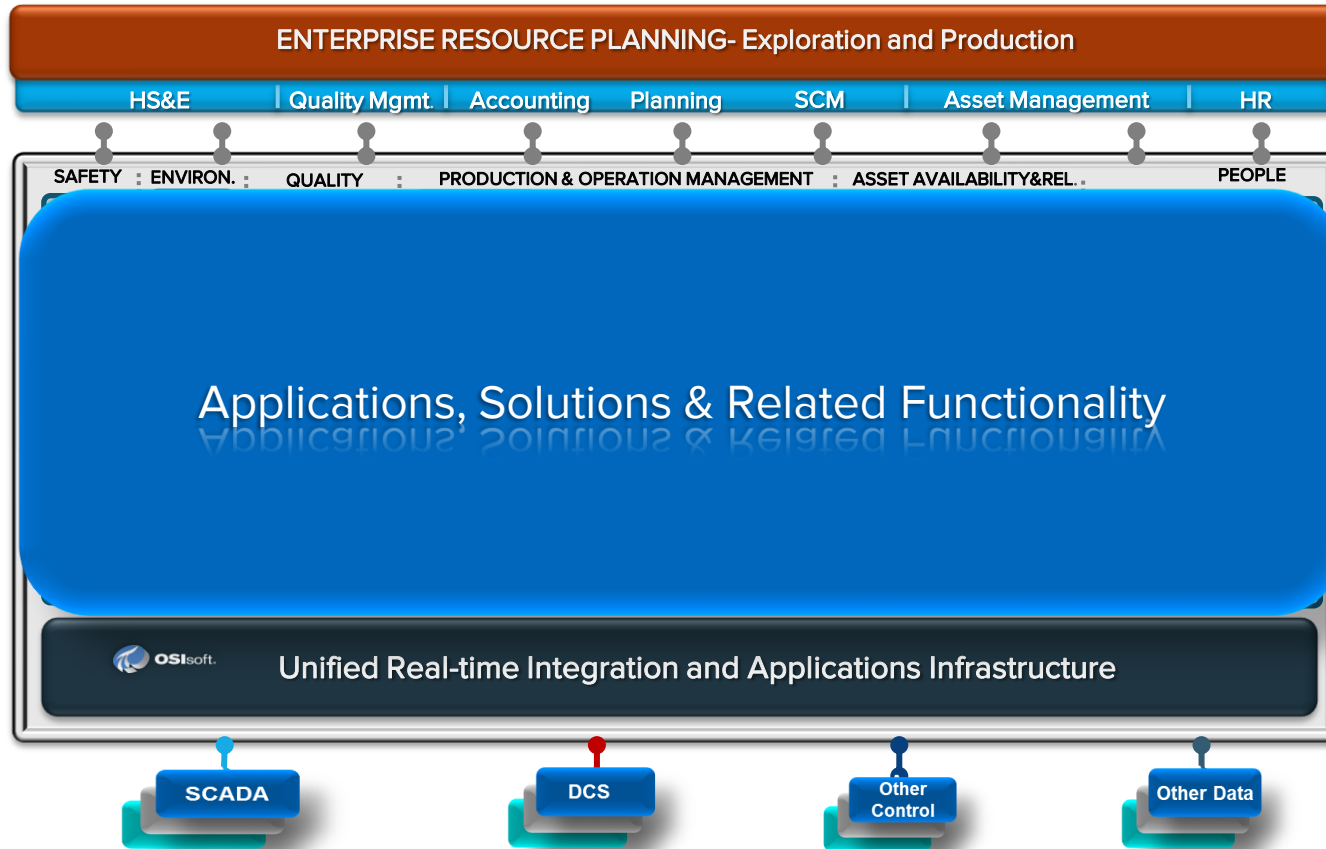| CHALLENGES	SOLUTION	RESULTS
23 separate applications from a variety of vendors including DCS; aggressive grassroots schedule	YASREF strategically chose the PI System as an integration and applications infrastructure applications	Enabled a smooth refinery startup, reduction of over 50% of the standard applications
• Lack of collaborative, data based decision making using standard DCS supplier approach	• Migrated standalone applications to the infrastructure with PI AF	• All calculations and analytics done once in the infrastructure
• Weak data and analytical foundation to enable OpEx and continuous improvement	• Used Microsoft platform to provide advanced web based reporting and decision support	• Provided KPIs and performance reporting foundation for OpEx

Moving Applications to & Integrating Solutions with the Data Infrastructure – Simplification & Standardization

ENTERPRISE RESOURCE PLANNING- Exploration and Production

| HS&E | Quality Mgmt. | Accounting | Planning | SCM | Asset Management | HR |

| SAFETY | ENVIRON. | QUALITY | PRODUCTION & OPERATION MANAGEMENT | ASSET AVAILABILITY&REL. | PEOPLE |

Applications, Solutions & Related Functionality

Unified Real-time Integration and Applications Infrastructure
OSIsoft.

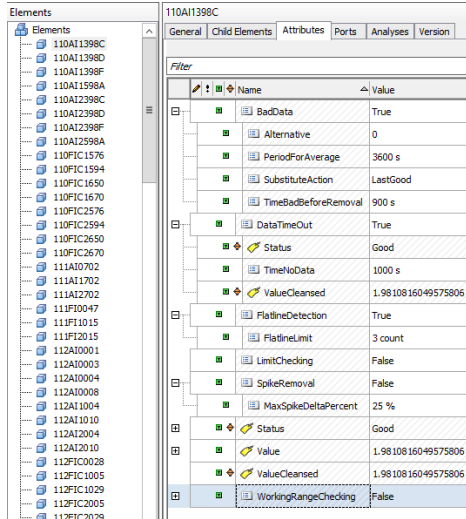| SCADA | DCS | Other Control | Other Data |

Multi-step Data Quality Assurance with PI AF

Data Quality is particularly important for regulatory and compliance reporting parameters. Users must be aware of the quality of the data they are basing their decisions on.

Cleanse Raw Data
- Remove Spikes
- Check range
- Detect flat line
- Use alt source for bad data

①

Calculate confidence level based on percent of good data of all input parameters

②

Reject Calculated results with the Confidence level below a threshold (e.g. 80%)

③

Bringing IT and OT Together -
Best in Class Reference Architecture

Leverage best practices in securing control systems and IT/OT Convergence

- ✓ **Fully redundant** architecture with interface, network, and server level failover

- ✓ **Strict rules and traffic control** across firewalls

- ✓ **High Availability** PI Collectives at all levels

- ✓ **Buffering data at all levels** to ensure no data loss in case of network or server outages

- ✓ **High frequency data collection** from the source
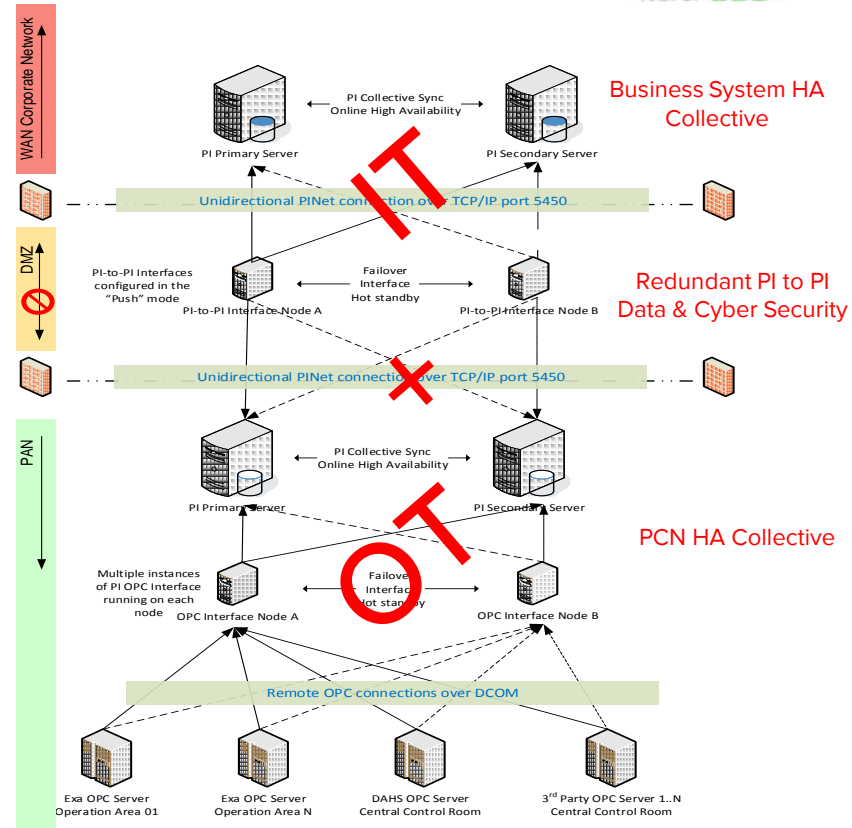
Reducing Costs per BOED Produced by 2-5% YOY* in E&P

Lifting Costs	Realized Production	HSSE	OpEx
Maintenance costs	Time to first production	Asset Integrity	Alignment/Best Practices
Asset efficiency	Production shortfall minimization	Environmental	KPI/exception based
Infrastructure costs	Production accounting	Cyber Security	Proactive/predictive data based decisions
Chemical Cost	Reservoir optimization	Remotiing	Collaboration
IT Costs			

* Distilled from the over 500 O&G customer uses cases presented at OSIsoft events

Improving Controllable Margin in Logistics by 2-5% YOY*

Operational Costs	Value Add Revenue	HSSE	OpEx
Energy	Asset Reliability &Utilization	Asset Integrity	Alignment/Best Practices
Maintenance	Hydrocarbon loss	Environmental	KPI/exception based
Compliance	Value Chain Integration and Optimization	Cyber Security	Proactive/predictive data based decisions
			Collaboration

* Distilled from the over 500 O&G customer uses cases presented at OSIsoft events

Improving Controllable Margin by 1-5% YOY* in HPI

Operational Costs	Value Add Revenue	HSSE	OpEx
Energy	Asset Reliability &Utilization	Asset Integrity	Alignment/Best Practices
Maintenance		Environmental	KPI/exception based
Compliance	Yields	Cyber Security	Proactive/predictive data based decisions
Chemicals/Additives	Hydrocarbon loss	Remoting	
Catalysts	Value Chain Integration		Collaboration

* Distilled from the over 500 O&G customer uses cases presented at OSIsoft events

Energy's New World…..

> Every PI System has these capabilities….the question is how have you been using….and more importantly, will you be using to respond to the "crisis opportunity" today and in the future.

Lets see how other customers are using the PI System to transform their world…