Operational Downstream Strategy at PEMEX

Improving Operational Safety & Reliability through ONE PI

Presented by OSIsoft
Agenda

• Pemex at a Glance
• The Journey to One Pi
• PEMEX’s Operational Portal
• Examples
• Results
• Next Steps
• Conclusion
OSIsoft @ Pemex production assets

PEMEX EXPLORACION PRODUCCION
- Región Norte
  - ATG y Al Poza Rica
  - Al Veracruz
  - Al Burgos
- Región Sur
- RMNE
  - Cantarel
  - Kumalop
- RMSO
- SDC

PEMEX GAS:
- Villahermosa
- Cactus
- Nuevo Pemex
- Cd Pemex
- LaVenta
- Coatzacoalcos
- Matapionche
- Poza Rica
- Arenque
- Reynosa

PEMEX REFINACION:
- Mexico City headquarters
- Cadereyta
- Madero
- Minatitlan
- Tula
- Salamanca
- Salina Cruz

PEMEX PPQ
Proyecto ONE PI en Pemex
Data and Information in Context with Integrated High Fidelity Drill Down – The Backbone of Dashboards

- Manage by metrics. In a hurry to get answers
- Access and interpret data for executives and managers, using BI tools
- Day to day operational needs underserved by traditional BI due to "complexity"

- Executives & Managers
  - Strategic
  - Headquarters View
- Business Analysts
  - Tactical
  - Refinery View
- Information Consumers
  - Operational
  - Field Engineer's View
Implementing PI as core in process control at PEMEX Refining

“We have implemented a proof of concept for Operational Control that provides system wide KPIs for critical assets and refineries. The initial results have been improving asset reliability, safety, and performance with positive impact of yield and production.

Mr. Carlos Manzano
Dirección Corporativa de Tecnología de Información y Procesos del Negocio, SCADA & Industrial Automation, Pemex

Business Case
- Low performance in refinery utilization, reliability, and yield
- Inability to share best practices across refining division
- Inability to view entire PEMEX refining value chain in real-time

Solution
- Expanded current PI System to provide integration & applications infrastructure elements
- Used PI AF and PI Coresight as foundational components
- PI to Pi that for PEMEX access

Results and Benefits
- Single Operational Indicators for all PEMEX refining
- Consistent KPIs to support continuous improvement of efforts
- Improved yields, production, reliability, and safety of refineries
The Road to Improving Operational Safety & Reliability

• **Issues with Rising Maintenance and Safely costs** – 30% Avoidable Errors

• December, 2014 – Scope definition
  – Establish the proper operation of the main equipment
  – Improve operational reliability.
  – Have a clear model definition for Refineries, Gas Plants and Petrochemicals Plants
Challenges to implement a One PI strategy

• Monitoring in an **standardized** manner at all refineries so all displays of the status of critical process for all different levels of equipment are the same.

• Conduct analysis showing the percentage of time that critical equipment is inside and outside safe ranges to help **prioritize** the require corrective action

• **Visibility.** Show critical equipment which are constantly operating out of safe range and record why corrective actions have not been made to them or means to determine the cause of deviations

• To have an approved platform, that is **simple** to operate, which contains **uniform rules** across the organization to determine the progress in the implementation and improvement of the system, upgrading information coming to another systems.
Simple solution to standardize all KPI

Process Variables and all KPI are presented & calculated in a standard way using PI AF
INTEGRATED DOWNSTREAM DASHBOARD

Planning

Monitor
Analysis
Action

Execution

PLANNING & OPTIMIZATION

DOWNSTREAM DASHBOARD

Operations

[Images of various industrial settings]
Refinery Operations

Objective

- Real time monitoring refinery operations

Features

- Plan vs Actual Production
- Stock levels of crude and finished products
- Detail DCS level view
- Refinery Problem EWS
Example – PEMEX Refinery Energy KPI Display

### PEMEX Refinery Energy Performance

**Fuel Gas**

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**Alkylation**

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Results

This project has allowed us to explore new solutions, ways to attack a problem in a holistic way, looking at all the possible angles that make life easier for operations personnel and has resulted in:

• Doubling the percentage of process variables "green" in less than 3 weeks of operation

• Building a system to monitor process conditions of over 2,600 variables

• A solution capable of monitoring process variables from operations, quality, power generation and any other areas to come in the future

• A certified, simple, easy ability to transport and adapt to other production processes
Next Steps…..

While we have achieved significant benefits we still have goals to achieve:

• **Strengthen the use of the solution** through internal marketing, video conferences and constantly monitor the operating windows on field in conjunction with the business area.

• **Improve the quality of information** contained in the model (operating limits, setpoints, text descriptions).

• **Quantify the benefits.**

• **Increase the functionality** of the solution integrating some additional graphics detail pages, setting response times and some other improvements to the navigation between the different pages.

• **Replicate this solution** to all Upstream assets, pumping stations, storage and distribution stations and generally to all centers where there Pemex processes require monitoring and control.
Javier Barella

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- SAM
- OSIsoft, LLC