Material balance and cost tracking in a pharmaceutical plant using OSIsoft infrastructure and Sigmafine technology

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Agenda

- Pimsoft Introduction
- Business Challenge
- Solution Description
- Obtained Results and Benefits
- Conclusion
Pimsoft

- Offices: Torino, Milano and Roma (Italia)
- Sigmafine® Principal Office: Houston (TX), USA
- Installed base: approximately 250 systems
  - From single plant to multisite management (worldwide)
- Technology:
  - OSIsoft PI System
  - Sigmafine® - Server based software
  - Sigmafine® components and dedicated databases (LNG, Thermodynamics)
- Resources: Engineers and IT professionals (approximately 45)
- Strategic Alliance:
  - OSIsoft - OEM & SI
  - Microsoft - MPN member - Silver Cloud Competency
Our Story

1995
- Synapsis founded
- OSIsoft distribution

2002
- Pimsoft Srl founded
- OSIsoft partnership and distributorship
- Partnership and integrator of Sigmafine

2010
- Pimsoft Inc. (USA) founded
- Pimsoft acquires Sigmafine business from OSIsoft

Our Product Story

1993
- Product launched by KBC Advanced Technologies (UK and US)

1999
- Acquired by OSIsoft LLC (PI System) (CA, USA)

1999-2009
- Release of SF 4
- New generation built on Asset Framework of OSIsoft

2010
- Acquired by Pimsoft Inc. (Houston, TX, USA)
**Sigmafine**

- Sigmafine is an application that allows the user to model a plant or a process to perform data reconciliation and validation based on mass, volume, component or energy balances based on the **PI Asset Framework** infrastructure and is **natively integrated with the OSIsoft® PI System®**
- Apply the principles of reconciliation to process models to solve the inconsistency of plant data and provide reliable results
- Capabilities includes diverse types of balances: mass, volume, energy, components, etc.
- It is a scalable solution and applicable to any type of industrial process
Data reconciliation is …

Improving the accuracy of process data by adjusting the measured values to meet the budget equation:

\[ \text{Input} - \text{Output} - \text{Accumulation} = 0 \]

Reconciliation is applied to a model that represents the process.
Business Challenge
Pharma Business Challenges

• Management of batch or semi-batch processes
• Tracking of raw materials up to the finished product
• Calculation of the cost of each batch
• Calculation of the economic impact of waste
• Validation and improvement of the quality of process data in PI
• Smart display of results
Fermentation Process
Tracking Challenge

[Diagram showing a process flow with various tanks, storage units, and recycling symbols.]

PI System for the Pharmaceutical Industry

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Solution

• Modeling of the fermentation process in OSIsoft AF structure (via Sigmafine)
• Calculation of the mass balance
• Calculation of the daily bulk composition (for raw materials) for the duration of the whole fermentation batch facilitating material cost calculation
• Dashbording of the results in PI Vision and Power BI
Work flow

AF Structure
- Asset AF
- Sigmafine Model
- Mass Balance
- Composition tracking

Dashboarding
- BI Dashboarding
- PI Vision Dashboarding

Action
- Decision Making

PI System for the Pharmaceutical Industry
BI – Daily Production Costs Dashboard
BI – Daily Waste Costs Dashboard
PI Vision Dashboards

**Fermenters**: Mass measured versus reconciled mass (Biased measurements identified)
Results and Conclusions
Results and Benefits

**Mass Balance**
- Identification of inconsistencies or errors in the input data
- Validates and calculates consistent measures
- Estimates of unmeasured flows

**Composition Tracking**
- Information on the exact cost of each batch
- Possibility of identifying the ideal fermentation duration

**Dashiboarding**
- Ability to quickly access production insights at both the business and process levels
Material Balance and Cost Tracking in the AF infrastructure

**COMPANY and GOAL**

Goal: monitor the waste and track the cost of the finished product and waste

**CHALLENGE**

Complex fermentation process and operational data available in different systems

- Operational data available in PI (flows, mass, tank levels), and in other external systems
- Many raw materials to trace

**SOLUTION**

Starting from OSIsoft PI and the AF structure for process modeling, mass balance and composition tracking analyzes are implemented through Sigmafine

- Upload of non-PI data via AF transfers
- Run the Mass balance and composition tracking analysis
- Dashbording and results reporting with BI tools and PI Vision

**RESULTS**

Identification of inconsistencies in the measurements, calculation of the cost of each batch. Identification of the ideal fermentation duration

- Identification of inconsistencies or errors in the input data through Sigmafine mass balance (e.g. Wrong waste log)
- Calculation of the cost of each batch in terms of raw materials
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Thank You