

The future of phosphogypsum: Prayon case study

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Introduction

- Phosphate producer located near a village
- Yearly production of 790,000 t PG
- Stacking limitation
- PG commercialisation is mandatory
 - Plaster and cement: 708,000 t PG
 - Agronomic use: 60,000 t PG



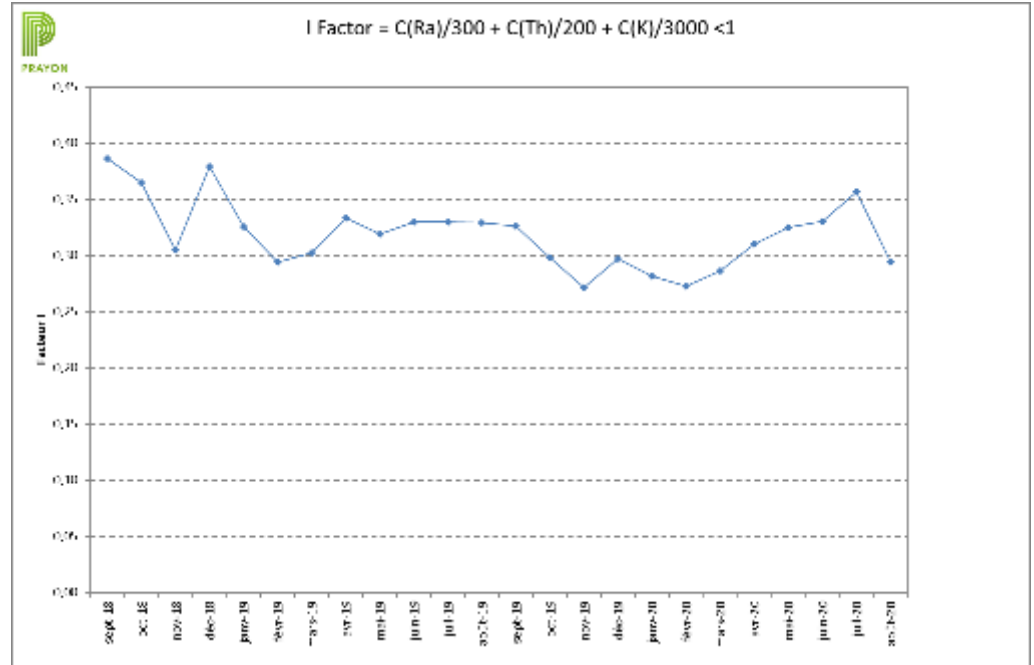
Introduction

- Strong commitment of all stakeholders to maintain production
- Foster
 - dialogue with customers
 - Innovation : 
 - Big data
 - Permanent interaction between production/R&D/Engineering department
 - Environmental commitment - Decontamination of used equipment



Customer dialogue

- Sometimes very strict standards to be followed
- Raw materials carefully chosen
 - Heavy metals, Na, K, Organic matters...
 - Th, U



Success Story...



- Licensing Division of Prayon
- Process Expertise

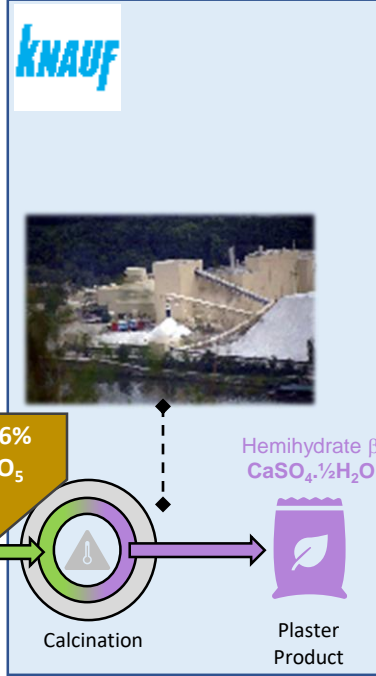
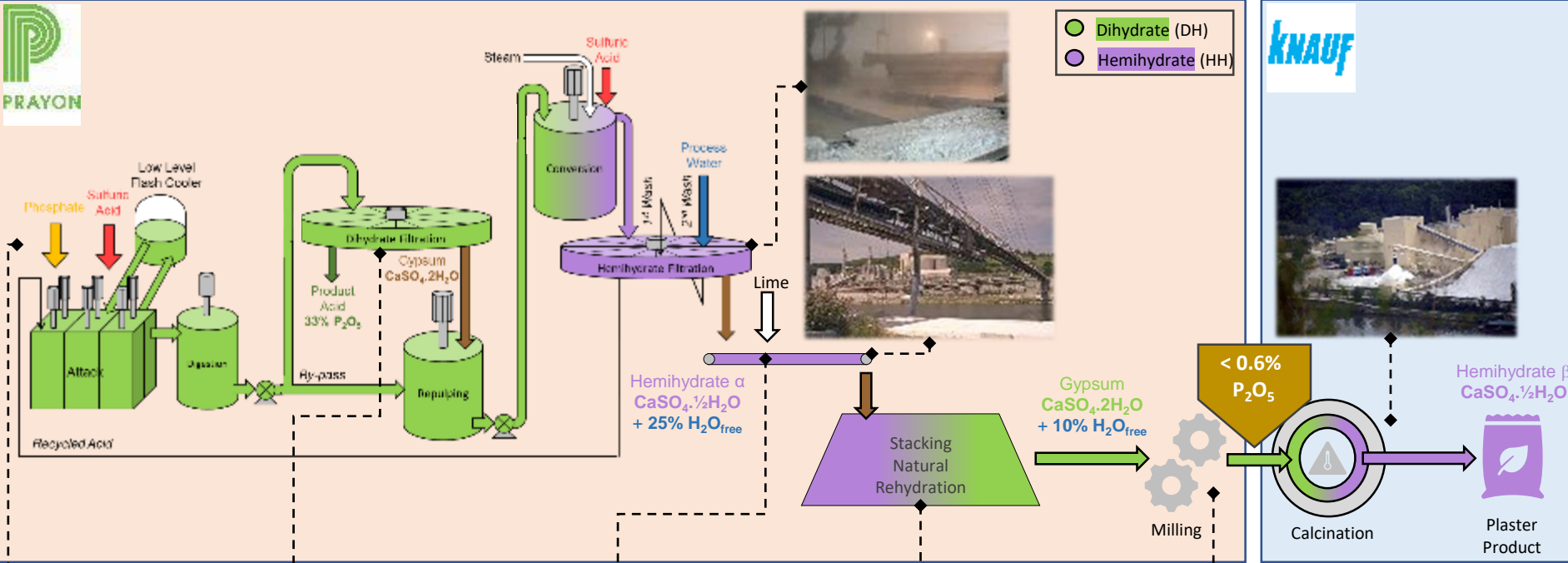


- IT Service
- Production Plant
- Analysis Laboratory



- Equipment Division of Prayon
- Manufacture, Supply and Supervision during Construction
- Maintenance Expertise

CPP - Phosphoric Acid Plant



PG quality improvement— P_2O_5 in Hemihydrate Cake

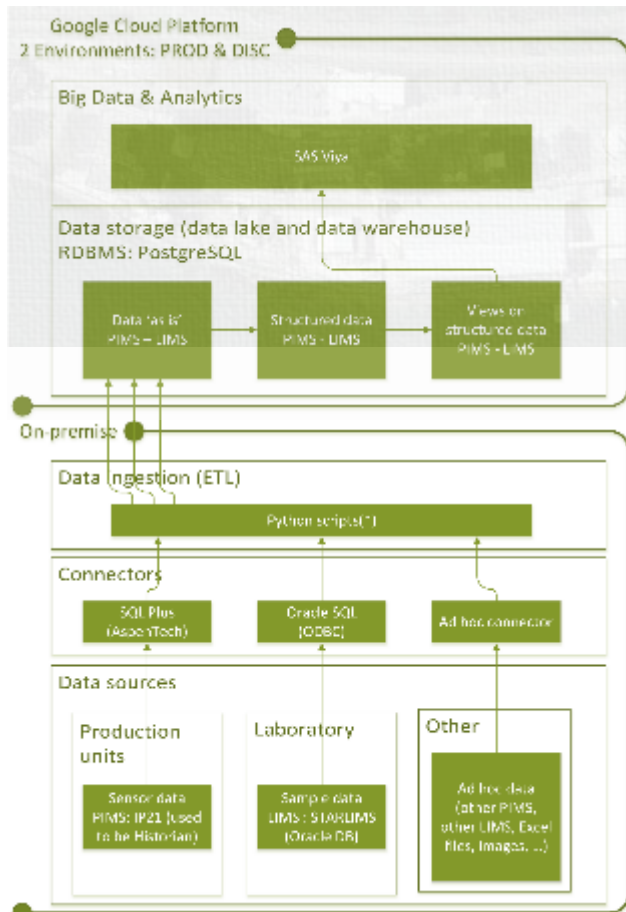
How to go from reactive to predictive control of the process?



Identification of a « **soft-sensor** » representative of the P_2O_5 content in the cake

How to identify such a « soft sensor »?

- Put together all **Data Sources** (from Production Units, Laboratory...)
- Use of a **Data Ingestion** Tool to treat all data collected
 - Alignment of the data in the time (as for example **Historian** is in realtime while **LIMS** consider the encoding time of the sample)
 - Translation in a common language (**Python**)



PG quality improvement– P_2O_5 in Hemihydrate Cake

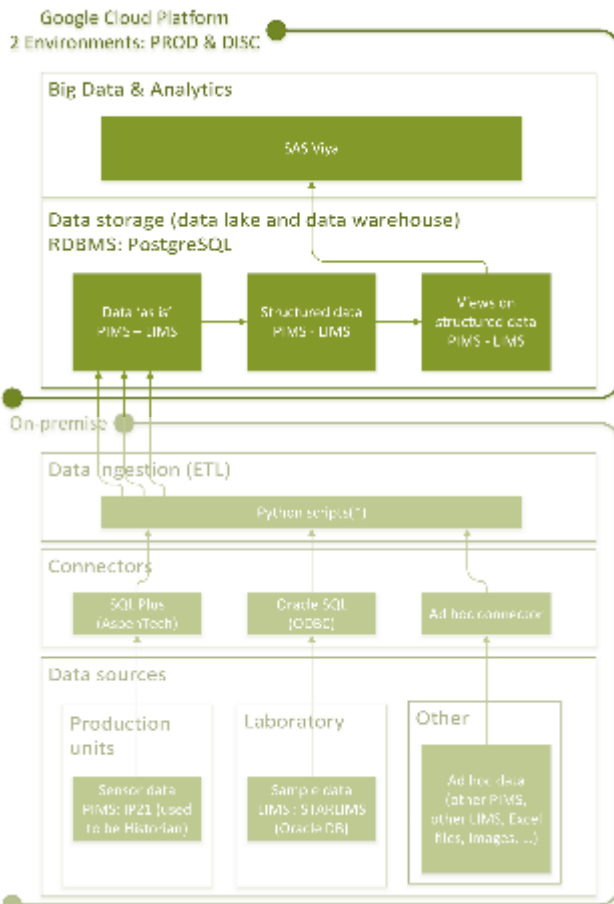
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Identification of a « **soft-sensor** » representative of the P_2O_5 content in the cake

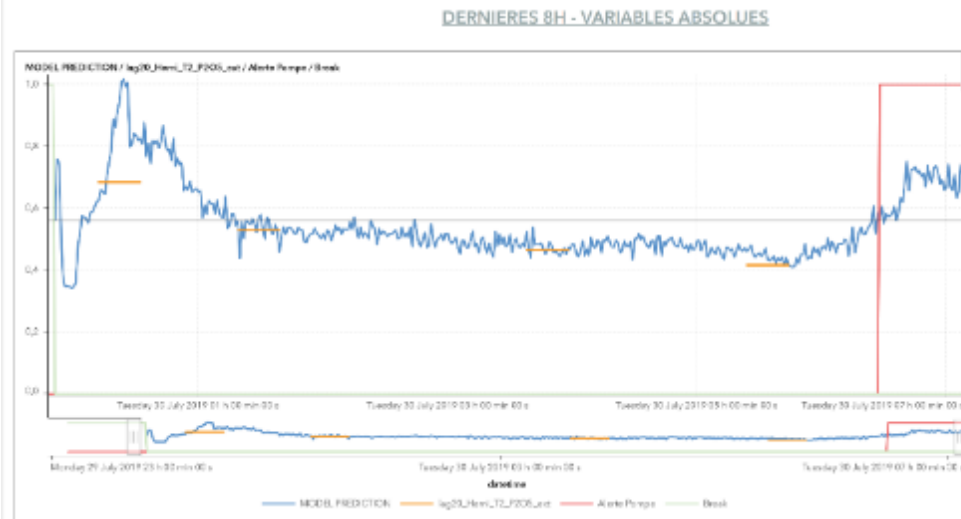
How to identify such a « soft sensor »?

- Translated data are transferred « as is » to the **Data Lake** or **Data Warehouse** where they are stored and structured.
- Use of the **Environment SAS** to treat all those data (also called « Algorithm Platform » - similar to a toolbox). SAS software is a **flexible** tool – it is adaptable to the type of data collected.
- With the help of SAS, some data – having a certain degree of correlation with P_2O_5 content in the cake – are highlighted and analyzed by project team.



PG quality improvement – P_2O_5 in Hemihydrate Cake

« Soft sensor » related to the P_2O_5 content in the hemihydrate cake = Speed of the Weak Wash Pump



En Activité
Oui

Base de Activité
Bac12

Alerte Filtration
Alerte

700 cases/year where P_2O_5 content is above the specification (0.6%)
→ **25%** of those cases are directly linked to the speed of the pump

Decontamination of used equipment

- Phosphate is linked to radioactivity
- Important to ensure environmental protection
- Permanent collaboration with local authority
 - Relation based on trust
 - Require high degree of commitment from our team
 - E.g. tank decontamination



Decontamination experience

- Phosacid plant decontamination
 - High pressure cleaning
 - Water spray to reduce dust
- Dismantling layer by layer
 - Gypsum recycled in the process
- Waste inspected by notified body (Vinsote Control Atom) → Simple waste that can be recycled or landfilled as non hazardous waste.



Prayon
Technologies





*Thank you for your
attention !*

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