RECOVERY BOILER

OPERATION OPTIMIZATION

Optimization tools based on multivariate data analysis (also known as data mining) help to improve the performance of recovery boiler (RB) operation in kraft mills. The tools monitor the RB and Key Performance Indicators (KPIs) and suggest control-setting changes to the operator for optimizing performance and detecting abnormal situations such as excess fouling, water leaks and combustion inefficiencies.

METHODOLOGY

CanmetENERGY's EXPLORE software was used to analyze RB historical data to develop accurate operation and prediction models that allow for:

- KPI development
- Simulation and interpretation of operating scenarios
- Soft sensor development to monitor and control non-continuously or hard to measure variables
- Online identification of optimal operating conditions
- Online decision support system for variability reduction and fault detection
- Global RB behaviour monitoring and understanding

BENEFITS

The proposed approach leads to immediate benefits such as:

- Increased operation understanding
- Increased steam production by 3-5%
- Improved reliability and operation control
- Better management of abnormal situations (faults)
- More accurate monitoring of quality parameters and GHG emissions
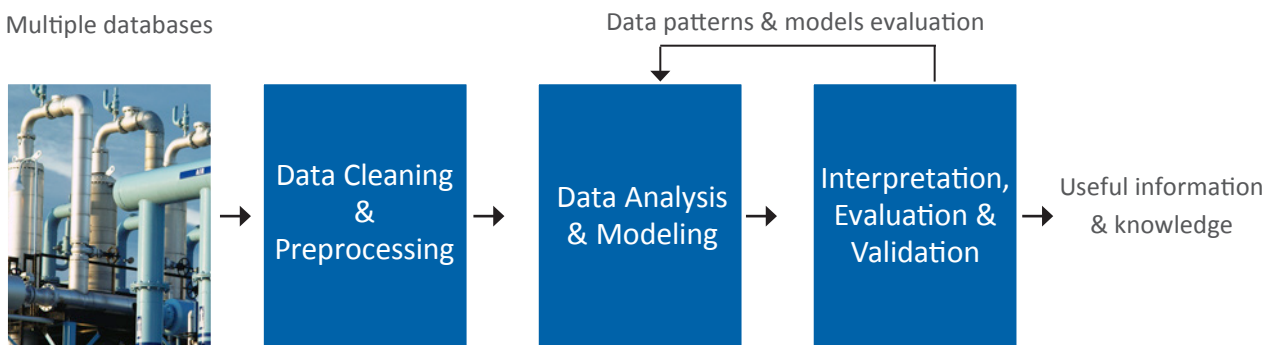- Operator duties made simpler and easier

Canada

ADVANTAGES

Low cost solution:
No/low capital cost (typical return on investment period is a few months)
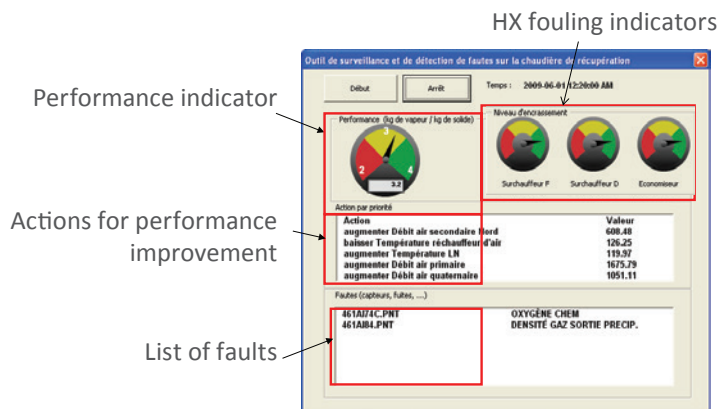
- User-friendly, Windows-based
- No need to be physically installed in the boiler control room or connected to plant controls
- Easy to keep up-to-date and to take process and/or operation changes into account
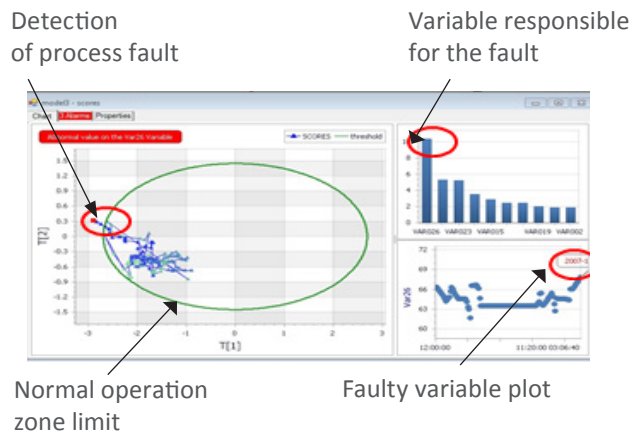
DATA MINING APPROACH FOR PROCESS OPERATION OPTIMIZATION

Multiple databases

Data patterns & models evaluation

Data Cleaning & Preprocessing → Data Analysis & Modeling → Interpretation, Evaluation & Validation → Useful information & knowledge

PERFORMANCE MONITORING TOOL

HX fouling indicators

Performance indicator

Actions for performance improvement

List of faults

FAULT DETECTION TOOL

Detection of process fault

Variable responsible for the fault

Normal operation zone limit

Faulty variable plot