
Data Reconciliation for Advanced Production Accounting

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About the Client

National Peroxide Limited (N.P.L) established in 1954 in Mumbai is one of the reputed manufacturers of peroxygen chemicals in India and globally. They are the largest manufacturer of Hydrogen Peroxide in India with an installed capacity of 84,000 M.T.P.A on 50% w/w basis. Their fully integrated manufacturing site for Hydrogen Peroxide is located at Kalyan in Maharashtra.

Motivation

Increasing market demand in recent years has forced process industries to re-assess their production capacities. The usual strategy to address the requirement of increased production is through capital investment into process units which act as bottle-necks of the entire plant's production. Their identification is dependent on the data of process parameters measured across the plant. However, the measurements of the process parameters are often erroneous. If capital investments were to be made based on decisions driven by analyses done on such erroneous sensor data, it can prove to be financially disastrous. Faced with a similar conundrum, the client approached **Gyan Data** with a requirement for providing tailor-made software solution which would reconcile their existing sensor data resulting in relatively error free data for performing mission critical decisions.

Problem

The significant challenge in this data reconciliation project was integration with third party thermodynamic modules and an optimizer. Python was chosen as the language as it was suitable for rapid prototyping and testing. Though a python interface was available for the thermodynamic module, it was not capable of handling chemical mixtures.

Another issue that had to be addressed was that the thermodynamic package provided properties only for non-reacting systems. This ofcourse was not acceptable for application in reacting systems such as the client's. Also observed were multiple flow sensors located on the same stream which was not applicable for use in the standard reconciliation framework.

Solution

The existing interface for the thermodynamic package was modified to handle mixtures. Since the reliability of the solution was dependent on the robustness of the optimizer, it was run through several test cases and appropriate modifications were made to handle edge case scenarios.

The problem of reacting systems was addressed by computing the offset term that needed to be added to the enthalpy values provided by the package. The additional sensors were incorporated into the existing reconciliation framework by creating virtual streams on which each of the additional sensors were mounted.

The client had requested for making the solution more accessible to their manufacturing plant personnel. The software solution provided an Excel interface for configuring the plant. Upon execution of the program the reconciled results were written into spreadsheets accessible to the client's plant personnel with their native

applications.

This allowed off-line use of the data reconciliation framework. Catering to the client request, **Gyan Data** had abstracted the core ingredients of the data reconciliation framework by attempting to develop a full-fledged user interface for easy on-the-fly plant configuration and data reconciliation to allow seamless integration into the client's on-line operations.