Minimize Vented Steam in Dual Boiler System

OIL & GAS, PETROCHEMICALS, CHEMICALS, POWER GENERATION

Data Sources

- Process data: AspenTech IP21, Honeywell PHD, AVEVA PI System, etc.
- Historical maintenance data from a maintenance database (e.g. SAP)

Data Cleansing

- Signals cleansed to remove outliers and downtime data.

Reporting & Collaboration

- The Seeq Journal feature was used to document the workflow that the engineers took when building out this analysis, as this would be needed to justify this change in operating mode to site management.
- An Organizer Topic was built to present the results of the analysis, highlighting the potential energy cost and carbon footprint savings of this alternative operating strategy. These benefits were displayed alongside the calculated risk metrics based on historical data, enabling informed decision making by the management team.

Challenge

Process manufacturing companies are looking for ways to improve sustainability and drive progress toward carbon neutral operations. Wasted energy is one of the largest contributors to carbon emissions, and utilities providers or unit operations frequently comprise the largest source of energy waste. Manufacturers need a way to identify the time periods of wasteful operation, which come in the form of vented steam, excessive electricity consumption, and others, and quantify that waste as a financial loss or CO2 equivalent. These quantities provide a common benchmark for comparing alternative operating strategies.

Solution

Seeq can be leveraged to identify a steam optimization strategy that justifies the idling of a single boiler in a dual boiler operation.

Using Seeq conditions, subject matter experts (SMEs) can identify time periods when the dual boiler system is operating at minimum firing rates and still venting steam. These time periods can be used to aggregate the potential steam savings on an annual basis.

Next, SMEs can use analyzed historical data to understand the probability of a boiler trip, which can have significant financial impact in a single boiler operation. The potential steam cost and energy savings can then be weighed against the risk (probability x financial consequence) of running a single boiler.

Results

In one case, a large refining company was looking to justify the idling of a single boiler in a dual boiler operation during the warm months of the year. By performing this analysis, the operating team provided upper management with the data required to make the decision to idle one boiler during prolonged periods of warm weather. This decision saved them an average of $500k per year in vented steam costs and reduced their carbon footprint by reducing the energy input into the boiler system used to generate the vented steam.