

Benefits of Outcome Based Engineering In the Chemical Industry

What does Outcome Based Engineering (OBE) look like?

Avid Solutions has delivered well over 300 successful projects for one of our valued long-term Trusted Partners in the Chemical industry. In addition to plant defined process scopes, we have also contributed to process improvements that continually generate significant ROI along the way. Often, we have found ourselves working with engineering, maintenance, and operations to identify how to make process units run better from the mine to the finished product. Even our current largest active project, MAP, included several days of analyzing the process for potential improvement.

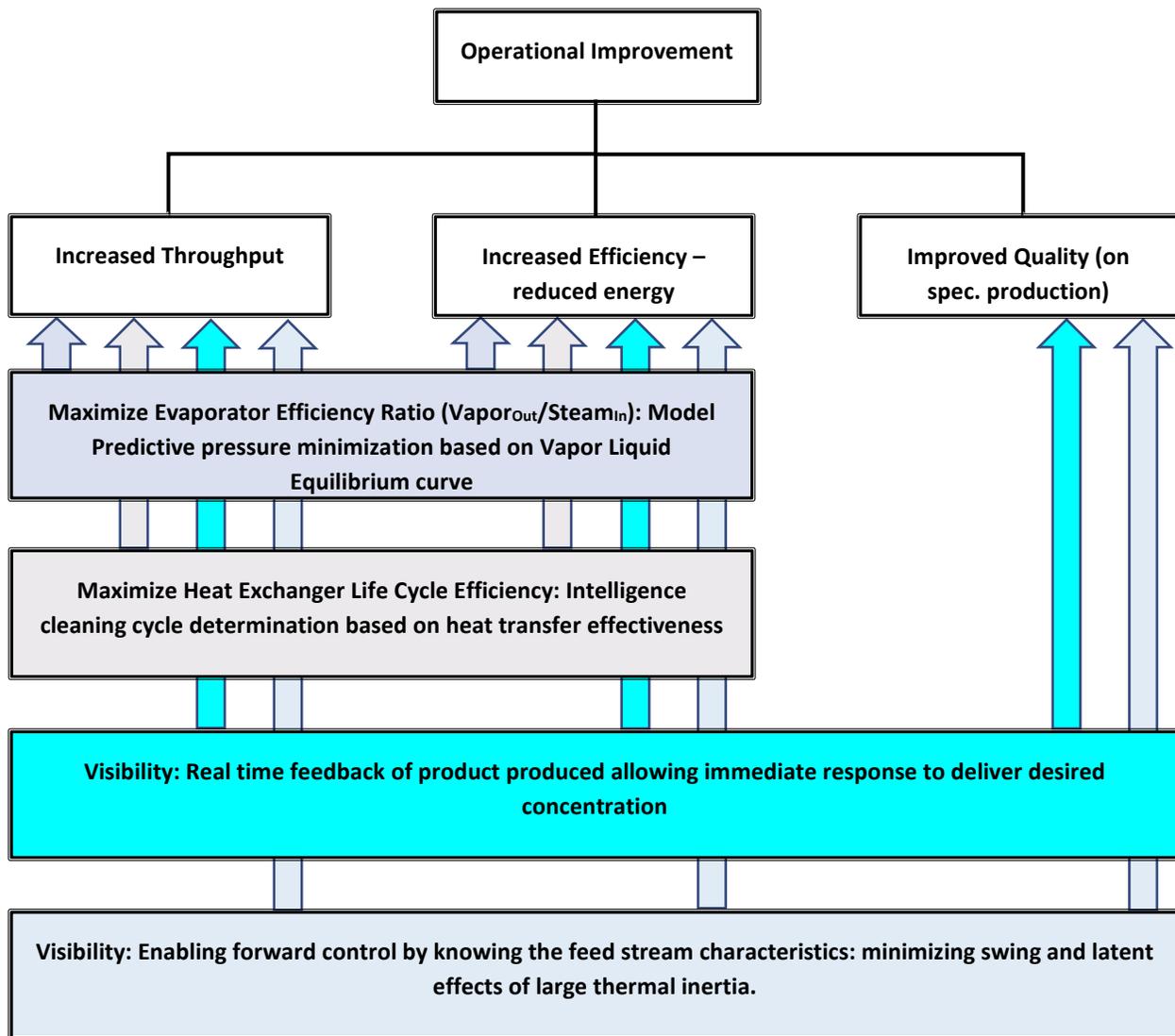
While several identified improvements remain to be implemented, our achievements with the plant will continue to yield return as each production unit continues operation. Some of the primary process area examples include:

1. When informed that calcined rock was a prime bottleneck in the making of high-quality phosphoric acid, Avid studied the 6 units and identified many ways to improve operational throughput and efficiency, beginning with greater operational awareness. The modernization of controls projects beginning with one unit then progressing through all 6 units yielded double digit throughput percent improvement (tons/hr.). Similar throughput and efficiency gains remain to be recognized by implementing remaining recommendations.
2. Following an explosion, Avid participated voluntarily in the Calciner HAZOP meeting, providing engineering leadership and improvement ideas for safe operation. Those ideas were implemented in a follow up project resulting in reduced hazard potential and severity of impact.
3. Because of previously achieved process improvements, Avid was asked to join the evaporator team to identify ways to improve operations there. Avid conducted an analysis and provided a study that determined 4 ways to improve the process as summarized below. Only 1 of these 4 improvements have been implemented so far with results to follow over the next quarter.

A study of the evaporators was conducted with the purpose of enabling immediate and sustained operational improvement. Resulting from this study, four means to effect real and significant positive movement of three Key Performance Indicators (KPIs) were identified. Those three quantifiable KPIs for operational improvement were:

1. Increased throughput
2. Increased operational efficiency
3. Improved delivery of the specified phosphoric acid concentration

To achieve these three improved operation outcomes, four process control techniques were determined to be foundational to achieving the desired results. The following diagram links these foundational engineered solutions to their effected KPIs as required to deliver a significant positive step toward operational excellence.



4. Due to the corrosive nature of STF, plant shutdown for compressor maintenance was required frequently. Avid cut the time to return to operation by 2/3 by studying and implementing automatic startup sequences - increasing uptime significantly.
5. Avid was also asked to examine pit car operation to determine improvements in how ore was being transferred to the mine. As is often the case, Avid independently drew a similar conclusion for a different approach as had been proposed by the plant, confirming the solution.
6. In studying the Craigo separation process used in flotation for process improvement, Avid again produced several recommendations to improve operations by reducing product loss, balancing chemical addition, and by providing feedback analysis on ore concentration from the mine. While these ideas were not implemented, the analyzer approach idea carried over to acid train attack tank analysis for optimization. Avid participated in meeting with the plant chemist in exploring predictive model approaches.