INEOS Chlor and GPC

The Problem

A manufacturing process suffered frequent and substantial disturbances to its feedstock causing it to make many undesirable by-products if several other variables were not quickly changed to compensate. The product being made was sampled once every 12 hours but the analysis results were not available until five hours after that. The process was operated with experience-based judgment of what it was making extrapolated from process settings and hindsight.

Many different methods of improving operability, including an expert system rule base, had been tried on the plant during its lifetime, culminating in a steady improvement in its efficiency.

Our problem was that the GPC Alarm Advisory Algorithm, while giving very sophisticated operating advice on paper, needed a real process to prove the quality of the advice.

The Project

The project objectives included engineer assessment of the new alarms compared to their existing alarms: documented operator usage of Human Machine Interaction and improved Key Performance Indicators through open-loop use of the Advisory Algorithm. Both product quality improvement and process operations improvement were expected.

The Solution

Historical operating data was examined using Curvaceous Visual Explorer (CVE) offline to understand past performance and identify several improvements. These included anomalies in the rules of the rule-based system that was being replaced. A Best Operating Zone was selected and a GPC model built using CPM. The quality of Operator Alerts was investigated and false alerts reduced at the first attempt from 49% to less than 10%. The models were then run with real- time data by engineers for several weeks in order to build confidence in the quality of operating advice being generated before CPM was put into the control room for operator use.

What followed can safely be described as success. Ineos Chlor used GPC for several weeks in the control room in operator advisory mode. Not only did it gain a 2% improvement in the efficiency of their process in the first 3 weeks and reduce the startup time by a factor of six, but other benefits were also readily apparent.

One of the main advantages of GPC is that it is so easy to use. Simple visual analysis for definition of their Best Operating Zone (BOZ) led to many valuable and unexpected discoveries. Quality and operations improvement was dramatic and is still continuing as the company's operators gain more confidence and implement more of the Advice.