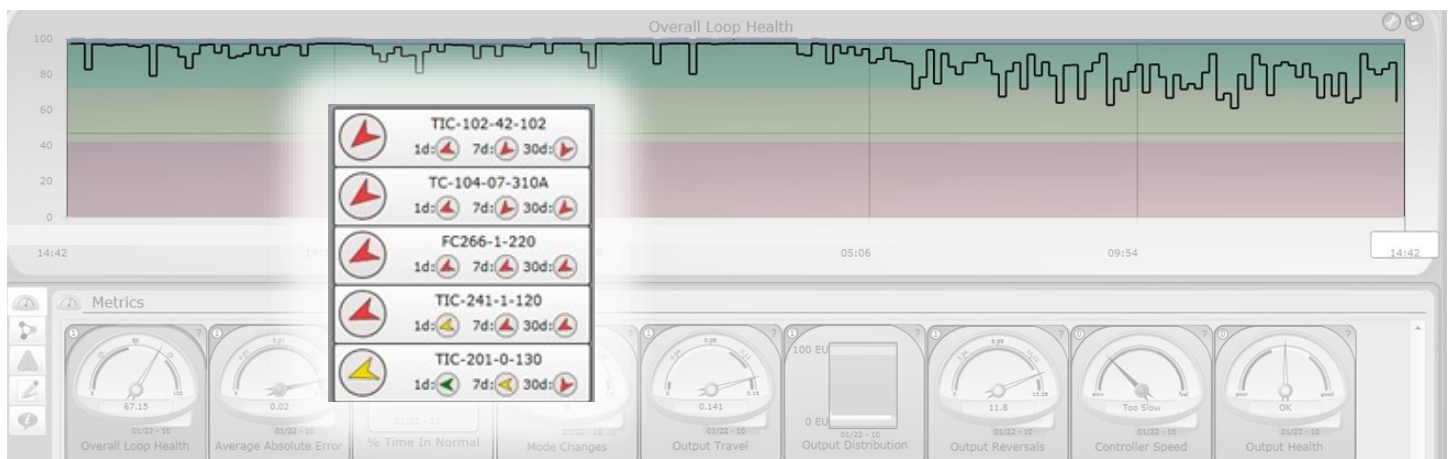


## Semiconductors: *Detecting Unseen Process Deterioration*

Incremental changes in performance can be nearly impossible to detect. Fortunately, PlantESP identified the slow and steady deterioration in performance of the main cooling tower at this semiconductor fabrication plant. Right under the nose of the fab's production staff the Overall Loop Health of a primary level controller slipped by ~20% over a span of two weeks. While staff overlooked the change in performance PlantESP singled it out as one of several "Troublemakers" based on the decline. The PID at issue was responsible for regulating the level of cooling water. As a result of the loop's degraded performance excessive amounts of water was required to keep the temperature within acceptable constraints. And while cooling water is a relatively inexpensive resource, at \$1.80 per m<sup>3</sup> the fab's staff quickly determined that the slip in performance would raise annual production costs by over \$60,000.00. Most production facilities have so many loops that it can be difficult to isolate those that require attention. The user capitalized on this PlantESP 'catch' and associated process diagnostics, putting the Troublemaker in a much needed time-out!



*Troublemakers is a helpful utility within PlantESP used to identify PID controllers that demonstrate significant change in performance over fixed periods of time (i.e. 1-day, 1-week, and 1-month). Troublemakers ranks the selected loops based on their respective rate of change in Overall Loop Health. With a single click on any Troublemaker the user can view a trend of the loop's performance and access a library of essential KPIs that characterize the nature of the performance issue.*

### What was the cause?

A process' dynamics isn't the only thing that changes over time and that negatively impacts performance. Instrumentation used to measure process variables and manipulate control devices is also subject to time variant behavior. That certainly proved to be the case with this loop. Specifically, the fab applied a Cycles of Concentration approach to regulate the Cooling Tower with control of both level and conductivity playing a key role. The process errantly demanded additional water when calibration of the two loops faltered. Unfortunately calibration issues like this often go undetected as evidence of their change is not obvious.

### How did PlantESP find it?

Troublemakers is one of several alerting tools within PlantESP that informs users of significant change in control loop performance. It assesses the rate of change in Overall Loop Health of each loop, focusing on common periods of plant operation. The level loop within the Cooling Tower was one of three PIDs that exhibited deteriorated performance over each period. By clicking on the Troublemaker the user immediately saw how the change had gone undetected over a 2-week period. Further investigation by the fab's engineering team linked the issue to faulty instrumentation calibration.