# Basic Materials:
Maximizing the Value of Plant Automation

The results are in – operating PIDs in automatic mode proved again to enhance production and save money. Specifically, PlantESP singled out a group of loops when all 176 from the plant were sorted based on their Percent Time in Normal Mode. The loops were found operating 100% in manual mode. As could be expected their variability required operation farther away from process constraints and demanded special operator attention. A few hours of tuning eliminated the variability and the loops transitioned to full automatic mode. What's more plant staff lowered Set Points by an average of 5° Fahrenheit, moving the processes closer to constraints. As a result ~1% less natural gas valued at $0.10/minute or over $50,000.00/year was consumed. The cost reduction didn't factor other benefits linked to increased quality and decreased wear and tear.

Importance	Loop Health	AAE	% Time in Normal ▲	Mode Changes	Noise Band	Oscillations	Uptime	Output Travel	SetPoint Changes	Stiction Likelihood	Stiction Amount	Output Reversals	Tuning Deviation	PV Variance
3	77.9	8.57	0	0	4.12	15.7	75.5	0.132	0	---	0	3.42	---	112
3	82.8	5.38	0	0.292	0.129					24.9	0.00357	0.5	---	8.73
3	70.8	238	0	0.167	0.365					---	0	0	---	1.55E+03
0	78.5	279	0	0.143	4.46					0	0	0.679	---	2.35E+04
0	67.6	0.413	0	0.143	0.701					---	0	0	---	1.72E+03
3	75.6	18.4	8.27	0.417	0.566					13.3	0.714	23.4	---	180
3	78.1	150	8.29	0.5	3.68					0	0	58.6	---	7.92E+03
3	75.5	7.18	8.45	0.333	0.751					0	0	3.79	---	23.7
3	81.8	18.3	34.6	0.786	0.668					---	0	1.71	0.398	200
3	86.7	66.9	34.6	0.714	2.55					6.79	0.143	4.57	---	1.05E+03
3	87.1	75.4	44	1	0.345					14	0.614	1.36	0.772	776
3	91.8	6.12E+03	67	1.04	975					0	0	87.5	---	3.24E+08
5	77.9	0.477	72.3	0.286	0.0248					0	0	258	4.83	0.197
2	88.5	0.139	72.4	0.286	0.0281					0	0	385	0.241	0.962
2	87.6	0.145	86.2	0.214	0.0403					0	0	412	0.105	2.49
3	95.5	5.37	98	0.542	2.03					26.8	0.536	25.3	0.348	788
3	91	4.12	98.2	0.958	0.581					33.3	1.08	7.67	0.35	355
3	92.7	2.37	99.6	0.857	0.185					0	0	11.3	---	25.1
3	92.2	9.24	99.9	0.375	2.87	5.91	75.5	1.05	1.15E+03	7.62	0.857	24.1	0.198	1.17E+03
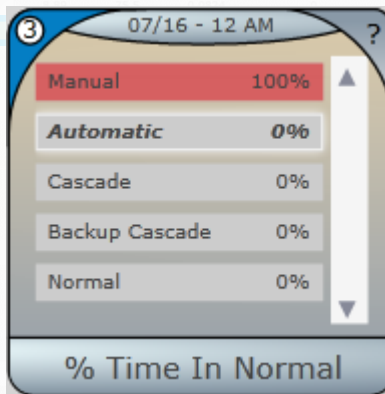
A segment of the TableVue utility highlights one of the plant's temperature loops, showing a % Time in Normal value of "0" for Automatic. Each column in the table corresponds with a different PlantESP KPI, and the columns can be easily sorted with a single mouse click. Upon reviewing the data users can then click on a given row. Hyperlinks within the table instantly connect the user to a comprehensive assessment of the corresponding loop's performance history.

What was the cause?

If a PID loop is not occasionally tuned, then variability will increase over time as the loop's dynamics evolve. A PID's ability to correct for disturbances is steadily undermined. In such cases it's common for highly variable loops to be switched from automatic to manual mode. Prior to tuning the PIDs plant's engineers confirmed that the operations team felt safer when the loops were under direct, manual control. For sure, maintaining effective control matters to a plant's bottom line as well as to the people that deliver it.

How did PlantESP find it?

TableVue™ is one of several at-a-glance utilities within PlantESP that enables users to quickly identify the source of performance issues. With a click on the % Time In Normal KPI the TableVue results sorted loops from worst to best (i.e. 0% to 100%). In the case of the group of 12 temperature loops each was shown to be operating 0% in its designated mode – they were being controlled 100% in manual mode. Plant management is often blind to details like mode, and it's difficult to correct what's unknown. Luckily there's PlantESP.