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CAGI
Compressed Air & Gas Institute

CASE STUDY

Case Study – System Controls

SITUATION: A large multi-service public utility provider was faced with an ongoing problem. The utility, which services 93,000 retail and wholesale customers, had five air compressors at one power generation facility. Four of the units were always on-line, and the fifth was back-up. Whenever one of the four units went down, by the time the back-up unit would come on line, it almost always pulled down the compressed air net operating pressure, which caused service interruptions to their customers.

SOLUTION: The utility asked the manufacturer of their air compressors to review the system. The team analyzed the facility and suggested a system reconfiguration that implemented an integrated compressor control system. With some minor modifications, the newly installed controller began monitoring and directing the system's various components, including dryers and valves, so as to diminish (or eliminate completely) system failures. By properly dividing operating hours between the compressors and ancillary products, scheduled maintenance could be provided due to the equal wear of each compressed air component. Furthermore, the control also had a single set point pressure setting of 85 psig, thereby eliminating the original multiple cascaded set points for each individual compressor. The electronic controller would instantaneously sense the failure of any of the on-line units and start the back-up compressor immediately. System pressure drops were eliminated, and so were the service interruptions.

OUTCOME: The changes reduced the system's operating pressure from 100 psi to 85 psi, resulting in a seven percent reduction in power consumption. As an additional benefit, the reconfiguration and inclusion of this remote system controller will also extend the life of the system's air compressors and ancillary products. This is because operational hours are divided equally between all five air compressors, the lead and back-up unit roles (each compressor becomes the back-up unit within the five week sequencing cycle) are changed weekly, and the lower operating pressure puts less stress on the compressors and the entire compressed air network. Maintenance costs are also reduced due to scheduled down times and preventative maintenance programs. Breakdowns are always costly, especially during full production runs and third shift or weekend mishaps, when labor costs can double and production product losses can be catastrophic. However; with equal wear and lower pressures, equipment life expectancy will be extended.

This provides a textbook example of how a compressed air system that is optimized and regulated by integrated controllers can reduce energy and operational costs. By reducing system pressure, an operator is able to regulate the system within a predefined window that optimizes the compressors' performance and compressed air network components as well. Integrated controller single point pressure settings add to lower energy consumption and system optimization.