

Stanford University Mini Case Study: Reducing Consumables Usage – Nitrogen Gas Leakage Detection July 2008

The Stanford Nanofabrication Facility (SNF) is a good example of a high-mix facility that has a wide range of customers. In any given month, nearly 250 researchers from Stanford, non-Stanford academic institutions, and industrial firms make use of this facility to build prototype devices and structures. There is an installed base of nearly 100 instruments that are used in the fabrication of advanced electronic devices, integrated optics structures, MEMS/NEMS devices, biological and biomedical devices, and structures based on nanotubes.

With so many diverse activities and processes in the laboratory, it is a challenge to monitor both the equipment and the building facilities to insure that they are operating properly. Because this facility was originally opened in 1985, there is a large installed base of analog gauges of various types with very few electronically monitored points.

Because nitrogen usage is the single largest non-salary expense in operating this facility, Stanford's management is always on the lookout for nitrogen leakage or waste. To help better monitor this key system, SNF has installed 21 WGRs on a variety of pressure gauges throughout the facility. Soon after installing the WGRs in the facility, engineers noted certain periodic drops in the nitrogen pressure delivered to the facility that had not been previously observed. With the timing of these pressure drops in hand, they were quickly able to determine that one of their spin rinse dryers was entering a nitrogen purge cycle much more frequently and for a longer duration than needed. It was a simple matter, once this was discovered, to alter the purge cycle to both save nitrogen and to reduce the pressure fluctuations in the nitrogen system. The ability to record and store this data makes it much easier to spot patterns and to correlate data from a variety of sensors that is virtually impossible by simply spot checking analog gauges.