Advanced Refrigeration Controls Application Case Study

Client Problem

A food manufacturer was concerned about maintaining cooler temperatures of his perishable products 24/365. Should the refrigeration system fail in one of his coolers he stood to lose over $500,000 of product. He was not convinced that his current system provided adequate protection and alarming against failure. He was unaware that his current system not only failed to have adequate alarming it also unnecessarily went into extended periods of heating mode to keep itself from icing up.

Energy Consulting Services Control Systems Solution

ECS designed and installed a Danfoss advanced refrigeration monitoring & control system. The Danfoss system monitors the refrigeration systems' integrity, controls all the refrigeration cycles for peak performance and efficiency, and sends alarms via text and/or email message if the refrigerant system fails to run properly.

What the client didn't know was that the evaporators in large food coolers almost always use electric defrost systems with standard thermostatic control and timeclocks to prevent coil freezing and system shutdown. This approach leads to dumping considerably more heat into the cooler than necessary to prevent coil freezing. The customized Danfoss system deploys a significantly more comprehensive set of controls than standard commercial cooler refrigeration systems. By controlling & monitoring all aspects of the refrigeration cycle (evaporator fans, defrost cycles, superheat, sub-cooling, head pressure, suction pressure, amperage) the Danfoss system lowers operating & maintenance costs and increases product shelf life.

The client has a large operation with 49 rooftop refrigeration units and 115 associated evaporators. The installed solution allowed the client to receive a $67,006.00 rebate from the electrical utility due to the energy saved by reducing the defrost time, evaporator run time and compressor run time. The system reduced the client's electric bills by 10% annually leading to an equivalent increase in sales of over 1.2 million dollars per year.

Results

Refrigeration runtimes were decreased on the average of 26% and defrost duration was reduced 67%. Annual operating costs were drive down by over $57,000.00. The client sleeps well at night knowing his seven figure inventory of food is well protected.