Alsum Produce

Produce Company Uses Opto 22's SNAP Ultimate I/O System for Refrigeration and Lighting Control, Energy Management, and Comprehensive Facilities Monitoring

Alsum Produce, located in the farming community of Randolph, Wisconsin, grows, handles, packs, ships, and stores onions, potatoes, assorted fruits, and other produce. The company started in 1973 as a one-person operation when Glen Alsum began buying 50 and 100-pound bags of Wisconsin-grown potatoes and onions, repackaging them into 5, 10, and 15-pound bags, and selling them to grocers in the Madison, Wisconsin area.

Over the next two decades, as the company enjoyed continued success, the Alsum Produce facilities kept expanding, soon growing into a 50,000 square-foot facility. But In 2002, Alsum experienced a devastating fire that resulted in major structural damage and much ruined equipment. Instead of lamenting this unfortunate turn of events, Alsum, in the enterprising spirit of its founder, decided to use it as an opportunity to expand the facility once again and, at the same time, address some longstanding automation and energy management issues.

As repairs and reconstruction commenced, Alsum made plans to double refrigeration operations within its facilities and quickly came to a somewhat foreboding conclusion. As Steve Tillema, Plant Manager explains, "We realized it was going to cost a lot of money to deploy separate control systems for what was now going to be much more widely dispersed equipment. Also, we recognized that we were under very strict guidelines for overall power consumption at the plant, so we needed the new control system to be able to help us address this issue."

The Integrator – Advanced Energy Control

To tackle these issues, Alsum engaged Advanced Energy Control (AEC) of Randolph, Wisconsin. AEC is an industrial controls company and systems integrator serving industrial and commercial firms nationwide. The firm's expertise includes ammonia & freon refrigeration control, food process control, HVAC and building management systems. In addition to AEC's impressive list of successful projects, Alsum was also interested in AEC's history of assisting clients in achieving significant energy savings through its approach towards controlling electricity demand and usage, both for the entire facility and its individual systems and equipment.

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"We design all of our control systems to help our clients maximize energy usage within the confines of the rate structures set forth by their power company," states Russ Sheppard, Senior Project Engineer at AEC and manager of the Alsum Produce project. "We wind up saving these clients a great deal of money by reducing and leveling electric demand and also by making the most of on & off peak times."

Rubber-belted conveyors move potatoes into Alsum's storage facilities which are environmentally monitored and controlled by the SNAP Ultimate I/O system.

Centralized Intelligence, Distributed I/O

From the myriad of control systems and components the experts at AEC are experienced with, an Opto 22 Ethernet-based SNAP Ultimate I/O system was chosen as the best choice for Alsum Produce.

"We recognized that in Alsum's case, a centralized intelligent control system with remote I/O at the individual refrigeration units would be most effective," says Sheppard.

AEC chose the SNAP Ultimate system, in part, because it has an intelligent controller that can communicate with, gather data from, and send commands to distributed I/O racks throughout a facility over a standard Ethernet network. As deployed by AEC, the SNAP system connects to and communicates with remote I/O units that, in turn, are connected to the Alsum refrigeration units' various components (such as evaporators and compressors) via analog and digital input/output modules on the I/O racks. The remote SNAP I/O units communicate over an Ethernet connection to the intelligent SNAP Ultimate "brain", which, through this connection, is able to control all of Alsum Produce's refrigeration systems. More specifically, the SNAP Ultimate unit controls the cooling processes, whereby refrigerant is pumped through a set of coiled heat exchanging pipes, compressed, and then sucked back.

To solve the customer's specific energy management problems (AEC's specialty), Sheppard considered Alsum's electricity demands, prescribed rates, and other factors before programming the SNAP Ultimate brain to monitor various temperature sensors for each refrigeration system and make adjustments in the cooling process so a specific range of kilowatt (KW) usage is maintained. For example, when the Alsum facility begins its bagging processes, the equipment involved in these processes naturally consumes extra energy. Through simple uptime/downtime monitoring, the SNAP Ultimate unit is able to recognize that the bagging equipment has been activated. The SNAP Ultimate brain then executes a program developed with ioControl (Opto 22's control programming software) that raises the KW usage level for the refrigeration systems high enough to allow for the needed bagging, but still within an acceptable range. When the bagging processes cease, the Ultimate unit readjusts the KW usage on the refrigerators back to normal.

At Alsum Produce, potatoes are stored in bins up to 18 feet high.

"Without this constant regulation by the SNAP Ultimate unit, kilowatt usage would be running wild every time we started the bagging line," says Sheppard.

Monitoring & Control Across The Facility

With Alsum Produce management more than satisfied with how their refrigeration processes were improved, AEC began to apply the SNAP system to other areas of the Alsum plant. The Alsum facilities have a great deal of fluorescent lighting, much of it, the high-pressure sodium type that glows orange. Sheppard connected the SNAP Ultimate I/O unit to these lights and associated motion detectors. Areas that remain unoccupied for a designated period of time remain unlit until the motion detectors sense movement. The SNAP Ultimate unit then recognizes that the motion detector has been activated and switches the lights on. For other areas of the facility, the SNAP system was programmed to switch the lights on and off at a specific time of day. AEC has even connected the SNAP system to Alsum's outside lighting and, through the use of sensors that monitor when the sun rises and sets, is turning Alsum's external lights on and off accordingly.

As part of its operations, Alsum Produce also maintains an impressive trucking line: six semi-trucks for long-distance transporting, ten trucks for local deliveries, and forty-two refrigerated, conveyor-bottom trailers. This fleet delivers fresh produce to markets in nearly every major city east of the Mississippi. The fleet is also used to haul potatoes and other produce from growers and farms back to the Alsum facility.

"Throughout the cold Wisconsin winter nights, these diesel truck engine blocks must be kept ward in order to start the next morning," says Josh Vander Galien, Chief Program Manager for AEC. "For this reason, the trucks are equipped with special heaters designed to do this very thing. Instead of leaving the heaters plugged in all night or all weekend, the Opto 22 hardware automatically turns on the heaters a few hours before the trucks are needed, thus saving a considerable amount of energy.

AEC determined that greater control over these heaters could mean big savings for the customer. But first it had to be determined how to capture the temperature readings and connect to the heater. AEC chose to use a wireless LAN device along with a temperature sensor in each truck to track external temperatures and communicate them to the SNAP Ultimate brain, which is programmed to send a command to turn the heaters on if the temperature reading is too low.

Maximizing The Technology Investment

Like many production and storage facilities of its type, the Alsum plant has a small fleet of forklifts, used to shuttle crates and boxes of produce within the facility. The batteries for these forklifts must be carefully maintained and charged regularly or the forklifts (which can cost close to $10,000 dollars each) could be damaged. Alsum decided to automate this process as well and has connected the SNAP Ultimate system to the forklift battery chargers. Plant supervisors at Alsum have used ioControl to develop a program that includes start and stop times for the SNAP Ultimate system to power on and run the chargers—usually a duration of 5 to 6 hours—so the forklifts stay properly charged.

A portion of the Alsum trucking fleet.

Finally, the Alsum facilities include special storage buildings for potatoes that are harvested and stored (sometimes all winter). The company can lose literally millions of dollars if these potatoes spoil, so the environment inside the storage building must be properly maintained.

Once again, using remote I/O racks, this time deployed inside the storage buildings, temperature, along with humidity and other environmental factors are constantly monitored.

"The readings are communicated via a serial link from the local I/O units back to the intelligent SNAP Ultimate brain that controls an autodialer, which in turn, is programmed to dial a series of designated phone numbers and deliver an alert if conditions in the storage building go out of spec," explains Sheppard.

Many of Alsum's facilities personnel have access to the storage building data, including the owner of the company. These individuals use ioDisplay (the HMI software for the Opto 22 monitoring and control system) to acknowledge alarms and view the data, while authorized users can also use the software to change thresholds, temperature set points, and other variables.

"ioDisplay has proven to be a truly amazing tool," says Tillema. "It's an HMI we can use to quickly aggregate and view data from every corner of the plant in meaningful but easy to understand ways. Whether it's the trucks, the forklifts, storage, or anything else, the appropriate individuals can use ioDisplay to view and make changes relating to the processes that *they're* responsible for. And management can use it to get the big picture on overall operations. For $99 bucks a seat, it's a very robust and useful piece of software."

Big ROI Through Energy Management

With its expansion, Alsum Produce grew into a 100,000 square foot facility, essentially doubling its size. In the process, Alsum went from 14 evaporators to 28 evaporators. But amazingly, thanks to the clever implementation of Opto 22 SNAP I/O systems by Sheppard and AEC, Alsum's energy bill stayed roughly the same as it was pre-expansion.

"Normally, in a plant like this, you would expect a 100% building expansion to lead to at least a double, maybe even an exponential increase in power consumption," says Sheppard. "But once we got all the new monitoring and automation hardware up and running, AEC essentially *decreased* Alsum's energy bill by fifty percent. The Opto systems were able to help us accomplish this, while at the same time addressing the company's process control and automation needs, which are the core of their business."

For more information on **Alsum Produce**, go to www.alsum.com.

For more information on **Advanced Energy Control**, go to www.advancedenergycontrol.com.

About Opto 22

Opto 22 manufactures and develops hardware and software products for applications in industrial automation, remote monitoring, and enterprise data acquisition. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's SNAP systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, or electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel. Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability. Opto 22 products are sold through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-OPTO or visit our Web site at www.opto22.com.