



Pharmacia Gets Cost-Effective Results

Like many plant engineers, Dave Tracy and Jim Vyuerberg of Pharmacia Corporation vividly remember the times when clipboards and shoe leather were the key components in monitoring energy consumption. They and their colleagues had to trek all over the plant to scribble down power meter data, then manually enter it into a spreadsheet program. At Pharmacia's Kalamazoo, Mich. plant, however, all that trekking and scribbling has been replaced by a power management system that saves time, cuts costs and preserves uptime.



Pharmacia is a New Jersey-based producer of a broad range of pharmaceutical products for global markets. Like many manufacturers, it uses activity-based costing to help manage its business. Activity based costing strives to identify the costs of producing a product by measuring the costs of all activities related to producing that product. Those costs can include labor and raw materials, electricity and other energies used to run machinery, a percentage of the heating and cooling, a percentage of the rent, etc. Part of tracking those costs involved making the rounds to collect power meter data.

The electrical engineering and maintenance staff at the Kalamazoo manufacturing plant know all about the requirements of activity based costing. For more than 10 years, the maintenance staff has been measuring energy use by department and process, and providing the information to the accounting department. Accounting uses that data in product cost calculations.

In the last 10 years, Pharmacia's need to track energy consumption by product has not changed, but the tools it uses to collect that information certainly have.



“We used to manually read the analog kWh meters for our internal billing customers,” Tracy said. “We had 125 internal billing meters and spent two days each month collecting the data, compiling it, and getting it to accounting.”

In addition to the time-consuming task of collecting, consolidating and reporting energy data, Pharmacia staff faced the difficult task of monitoring kW demand to understand loading. Pharmacia paid a person whose primary job was to do demand readings. Using a portable meter, he took measurements on 1,200 separate low voltage circuits, recorded the results on a clipboard, manually entered the measurements into a spreadsheet then added them to determine total loading on switchgear mains. This task alone was almost a full time job.

Tracy and Vyuerberg recognized the need for a new way to monitor power. It wasn't hard for them to determine that investing in power monitoring could pay off quickly.

The Pharmacia staff spent more than a year evaluating all available brands – even purchasing and installing trial meters – before they chose Square D's POWERLOGIC® power monitoring and control system. According to Vyuerberg, “The more we looked at it, the more we liked it. The history log was the most important information. We needed information we could trust to understand demand and loading.”

Their next step was installing circuit monitors at key locations and networking them to remote PCs in the maintenance and engineering offices and several other locations. Pharmacia decided to replace – instead of retrofit – many aging substations and put metering on every main and on most feeders. That decision expedited the installation of the circuit monitors.

Benefits became apparent soon after Pharmacia installed the circuit monitors and software; they first showed up in the monthly process of collecting energy readings for internal billing purposes. That process, which had typically taken two days, was reduced to about three hours even though it still involves a few manual reads.



After revamping internal billing, the Pharmacia team began focusing on peak demand and loading. Without an accurate picture of peak demand, it was difficult, if not impossible, to determine whether a given circuit had spare capacity to add new loads. Consequently, loading on transformers averaged only 40 percent, with too many breakers protecting loads that were too small.

Because they weren't sure if they had the required load capacity, Pharmacia engineers took measures that allowed them to err on the side of safety. To ensure reliability, each time a new process was added, they added a new 2,000 kVA, double-ended substation with a primary and backup circuit on each end.

Now, Tracy runs demand calculations on the switchgear mains daily. His POWERLOGIC software collects demand data, then exports the data to an Excel Spreadsheet. According to Tracy, "We now have accurate demand data on every piece of gear so we know where spare capacity exists."

As a result, Pharmacia has been able to balance the loading on the three incoming utility feeds. Transformers, which were previously loaded only 40 percent, are now loaded 65-75 percent on average; the team's goal is 85 percent base nameplate loading. Best of all, according to Tracy, "We've avoided the purchase of at least three new subs." Vyuerberg calculated that, by balancing loads and identifying spare capacity, Pharmacia has saved at least \$2 million in new equipment costs alone.

The company has realized additional savings by avoiding and minimizing downtime. Outages cause huge losses, especially considering that certain medicines must go through a batch fermentation process that can last up to 30 days. "If you lose that product, you not only lose the medicine, but you also lose all the time invested," Vyuerberg said. Depending on the product and processes in progress, losses from downtime can range from \$100,000 an hour to as much as \$23 million dollars a day, he said.



To help speed recovery when outages occur, the Pharmacia staff added an optional paging module to their power monitoring system. Now, when they have a problem, the pager alerts the supervisor – even at home – so he can dispatch people to the site. Tracy noted that, in the company’s sterile division, they often have only five to 15 minutes to react to an outage before the product must be considered spoiled, then discarded. Because the facility covers approximately two square miles, travel time to the source of the problem can be several minutes. “The paging system helps us react and pinpoint the source of the outage,” Tracy said. “If it saves 2 minutes on an outage, it pays for itself.”

The staff at Pharmacia continue to find new benefits from their monitoring system. Some of the other uses for the system include:

- Monitoring incoming utility lines. In doing so, Tracy has identified billing errors and received credits from the utility. Also, the system acts as a check tool to help ensure that utility equipment is properly calibrated.
- Using analog inputs on circuit monitors to monitor batteries and room temperatures in data center.
- Using inputs and outputs to control air compressors.
- Saving energy by monitoring amperage on 2,000 HP machines to determine when to start and stop the machines. The goal is to try to run 100 percent efficient before starting the next machine.
- Using the circuit monitor’s patented waveform capture and power quality features to diagnose and troubleshoot power quality problems in the research center.
- Using the system’s power quality features to document and provide evidence of voltage sags and spikes coming from the utility feed. The information was used to pinpoint the source of the trouble: bad contacts in the utility’s auto tap changer.

Almost 10 years into their effort to better monitor and control their power system, Tracy, Vyuerberg, and the rest of the Pharmacia engineering and maintenance staff are still



expanding their power monitoring system. It now includes more than 300 monitoring devices.

Tracy said he'd like to monitor down to every secondary feeder, and the team is considering expanding the system's monitoring scope to include water, gas, and steam. Vyuerberg hopes that the Kalamazoo plant can serve as a model for other Pharmacia locations. He is currently providing recommendations for power monitoring systems to three new plants in Puerto Rico and one in Belgium.

"Over the years, we've had fewer people on staff, so we try to provide the best tools to support them," Vyuerberg said. He points out that Pharmacia's entire Kalamazoo system – with annual power bill up to \$30 million and a 67-megawatt summer peak – is run by one supervisor and five highly qualified maintenance/operational technicians. "Our responsibility is to provide safe, reliable power at an economical cost," he said. "Achieving this goal has been a team effort between maintenance, engineering, and our consultant, Orion Consulting."

Also key in their success is their decision to avoid overly complex solutions. "Our goal is to keep it simple – simple gets results. Nothing magical, just common sense, and consistency." Teamwork, simplicity, common sense, and the right tools for the job – that's Pharmacia's formula for success.