Nitrogen... although you can’t see it, it’s everywhere around us. In fact, the earth’s atmosphere is 80% nitrogen. We tend to think of it as just a kind of fertilizer, but in a very real sense, nitrogen is necessary for all forms of plant and animal life. Plants require nitrogen to grow their roots, stalks and vines. And nitrogen must be continually available to feed the development of grains, fruits, nuts and vegetables essential to human nutrition. There’s no substitute for it. Nitrogen is truly the superstar of food production.

PCS Corporation is the second leading producer of nitrogen in the world, and offers a diverse portfolio of nitrogen-based products. Their Augusta, Georgia ammonia plant is the largest producer of nitrogen chemical and fertilizer products on the east coast of the United States, and has maintained an enviable record as one of the most reliable ammonia plants in the world.

“Ammonia is a commodity chemical and typically the margins are not great,” offers Keith Wilson, Ammonia Technology Manager at PCS – Nitrogen, “so the keys to making money are having a very efficient plant and

PCS – Nitrogen Uses Thin Client Technology With Wonderware To Modernize Its Plant Operations and Control

Operators at PCS – Nitrogen have been trained to visualize and control their plant operations using the static visual representation of the plant at the top of the wall, and then referring to the instrumentation directly below their specific area of interest.
Another, and still ongoing part of Anderson’s challenge was also to win over the operations people to the idea of using a modern DCS system to control the process. The challenge was formidable. More than 3000 wires needed to be reterminated. 20,000 lines of visual basic code needed to be converted to scripts. It would not be easy to find I/O that was compatible with the existing control system. Finally, the entire installation needed to be carried out without causing a plant shutdown. The solution for Anderson was to turn to Wonderware.

To help PCS Augusta stay ahead of the technology curve, they installed a new Moore APACS distributed control system (http://www.mooreproducts.com), as well as installing a variety of Wonderware products, including InTouch, InSQL and ActiveFactory.

“We had looked at various manufacturers,” said Anderson. “I also had experience with several of the HMI manufacturers. I felt that Wonderware provided a product that had more drivers, and had greater ease of use than some of the other products I had looked into. Because of the varied instrumentation that we had in the plant, we needed something that could be used with all of that instrumentation. Wonderware provided a solution and the drivers so that we could implement it and talk to all the instrumentation that we had on the plant site.”

After InTouch was installed and went into use, Anderson broke new ground for PCS – Nitrogen by becoming one of the first plants in the United States to implement thin client technology with the first applications based on running InTouch in their control room.

How Thin Client Technology Works

InTouch operates in a thin client mode that’s based on the mainframe paradigm, by leveraging the power of Windows 2000 Terminal Services. Each thin client realizes its own Windows session and operates independently from the other clients. Each client user gets a dedicated share of memory, some slices of CPU time, and access to the terminal server’s disks and applications as allowed. As the number of thin clients grows, the number of servers can grow as well. Clients can be dedicated to a particular server, or, at boot up, can automatically be directed to the server that is least busy.

When a thin client is powered up, it logs into the Windows server. In addition to giving the client access to the server’s resources, Windows also creates a virtual display. This display is then transferred to the client and is displayed on the local monitor or touchscreen. The client also takes input from the user (keyboard, mouse, touchscreen) and sends it back to the server. All of this is seamless to the operator. Adding another client is just a matter of plugging it into the network.

One of the key advantages of thin client technology is that system administrators can keep a server in a protected environment and give their users access to the server’s applications and data, in this case InTouch, through the use of inexpensive interfaces. At PCS – Nitrogen, Anderson chose to install the thin client software and components from ACP, of Alpharetta, GA (http://www.acpthinclient.com).
How Thin Client Technology Works at PCS - Nitrogen

The initial decision to implement thin client technology came about after the new APACS system was installed and operating. The plant operators were extremely pleased with the improvements in plant visualization, to the point where they asked for additional monitors in the control room. Anderson now had to decide how he would implement dual-screen monitors in the control room. This capability served the particular needs of PCS Augusta perfectly, since the operators had already asked for additional InTouch monitors to help them control the plant’s operation, but were concerned about keeping some of the plant’s original control room features, namely the control room’s panoramic display, intact.

While the panoramic display has long been a staple of chemical processing plants, Anderson realized that there were substantial economic and performance benefits to be realized if he could replace existing instrumentation with thin client hardware. “One positive financial bonus to using thin client technology is that we can give the operator the look and feel of single loop controllers and the visual look and feel of strip chart recorders using the thin client technology and we can do this at a cost of approximately one-third of what it would cost to install a four-pin recorder and a single loop controller,” says Anderson.

An additional benefit is that by combining the rich visualization capabilities of InTouch with the low cost of implementing thin clients, it’s now easier than ever before to bring true process visualization anywhere in the plant. In fact, the success PCS has had running InTouch in a thin client mode has led PCS to expand their plans for additional thin client applications using InTouch in the near future.

“Our intention at this point in time is to continue to use the thin client technology when we implement the DCS systems throughout the plant,” says Anderson. “Rather than going with dual monitor video cards or quad monitor video cards we’re going to use the thin client technology to provide multiple monitors so that the operators can have a better insight into their process. We also have local control boards throughout the plant. Right now on those local control boards, you only get to see a small portion of the instrumentation. We hope to use the thin client technology to give operators a view of the entire process from any location they happen to be at, using field mounted, hardened monitors on all of our local control panels in the field.

Best of all, PCS was able to successfully implement InTouch and thin client technology without the plant missing one day of lost time production. “Our biggest challenge to implementing Wonderware InTouch and the thin client technology was to do it in a way where we did not affect the day-to-day production of the plant,” says Anderson. “Thin client technology will help us to continue to do this in the future. To add additional monitors to the plant, we just install the thin client, the monitor and the Ethernet cable between the server and the hub that is already installed. It’s that simple.”

InSQL/ActiveFactory Combination Drives Plant Performance

In addition to InTouch and thin client technology, PCS takes advantage of case history 4

Cost-effective thin client software and interfaces from ACP deliver the InTouch information to users in the control room.
Wonderware’s InSQL technology, as well as ActiveFactory, to help them first analyze, and then optimize their production processes.

“We are very happy with the Wonderware installation and it has proved to be a big savings in terms of the amount of time it takes us to determine what is the problem. The trending capability of Wonderware and the historical data that is archived in InSQL has helped us on many occasions to determine exactly where a problem exists in the plant,” comments Anderson.

Wonderware’s IndustrialSQL Server is the world’s first high-performance real-time database for factory data. It combines the power and flexibility of a relational database with the speed and compression of a real-time system to integrate the office with the factory floor.

ActiveFactory is a full-featured suite of client applications that maximizes the value of the data in Wonderware’s InSQL. The ActiveFactory suite allows trend analysis of data over time, easy numerical analysis of data in MS Excel, ad hoc access to all of the data in InSQL and graphical visualization of the current plant state, as well as data reporting.

Keith Wilson, Ammonia Technology Manager for PCS – Nitrogen is a heavy user of ActiveFactory and uses Active Factory a lot to retrieve data from the InSQL historian. Typically he uses Active Factory’s trend module to do that. “I like the graphs,” says Wilson, “because they’re easy to include in reports, and I can pull up multiple points and trend them together to see what’s going on.

“I also use a plug-in to pull up historical data into Excel, so I can do calculations with it and also use it for regression and statistical analysis. Sometimes I’ll pull data into Excel and then copy it into a statistical control package and use it for SPC purposes,” he added.

In everyday use, the InSQL/ActiveFactory combination is helping PCS to do more with their production data and to do it faster.

Wilson regularly looks at temperatures, pressures and flows and also monitors the energy efficiency of the process. The flexibility of ActiveFactory allows him to easily experiment with a certain section of the plant for optimization purposes. “I’ll set up the trend module and put it in real-time mode so that the chart updates several times a minute with the actual plant data, and that allows me to keep an eye on the experiment or test that’s being done in the plant without spending all my time out in the control room with the operators,” says Wilson.

The bottom line for PCS – Nitrogen is that the InSQL/ActiveFactory combination saves time for PCS – Nitrogen engineers. “I also believe it improves the quality of the decisions that are made by actually having a good quantitative basis for deciding if a certain optimum as been achieved or whether a certain approach we’re using is really paying back so far as incremental production in the plant,” says Wilson.

At PCS Augusta, plant operations move continuously, and so does all of their manufacturing data. The combination of InTouch, thin client technology, InSQL and Active Factory is giving PCS a competitive edge, and keeps their business operations smelling sweet.