

Nexen Chemical Gains Process Reliability, Efficiency with Automation System Transition, Expansion

RESULTS

- Increased reliability
- Increased efficiency
- Improved control capabilities
- Reduced operator training cost
- Reduced shutdown/conversion time



APPLICATION

The plant makes Sodium Chlorate, a key bleaching agent used largely in the pulp and paper industries.

CUSTOMER

Nexen Chemical, Brandon, Manitoba, Canada

CHALLENGE

Nexen Chemical's Brandon, Manitoba, Canada plant makes about 190,000 tons a year of sodium chlorate. The product's raw materials are salt, water and a lot of electricity. In fact, power is 75% of the variable cost in the process.

Manitoba offers North America's lowest electrical power cost. But with no control over that cost, the only way Nexen stays cost-competitive is to control its process more efficiently and reliably. Efficiency improvements in the range of one percent are considered substantial. Making those incremental improvements while maintaining its aging control system was becoming a concern. The Brandon facility's Taylor MOD 300 DCS system was becoming obsolete; replacement components becoming unavailable.

SOLUTION

Knowing it had to update, Nexen selected Emerson Process Management's DeltaV™ digital automation system, citing capabilities like connectivity to fieldbus and DeviceNet digital bus technologies. But Nexen couldn't afford a lengthy shutdown to transition the plant's 1200 I/O from the old control system to the new. So to make the transition within the shortest possible shutdown window, Nexen looked to Emerson's sales representative office, Controltech Inc. of Winnipeg, for a creative—yet solid—solution.

“Without a doubt, we have been able to make some big improvements in both operating costs as well as reliability. Those improvements we effected by having the information available to make good decisions.”

Ed Garay

Senior Process Engineer, Nexen Chemical



For more information:
www.EmersonProcess.com/DeltaV



Pre-connected, pre-tested I/O

Controltech pre-connected and tested all the termination panels off-line before installation, keeping the MOD 300 I/O intact to avoid rewiring the instruments. Says Nexen's computer high voltage specialist Bob McManus, "The conversion project to the DeltaV system was designed so that we could pre-test the complete software package and the complete hardware equipment before we shut down the one DCS system and started up the new one. That gave us a degree of confidence in our conversion."

Data conversion

Controltech's assistant control specialist Mangesh Kumthekar says the biggest configuration challenge was to parse the data from the MOD 300 system. "We didn't have any real controlled items or write-up for it," he says, "so we had to parse through the MOD 300 data drawings to get the configuration details."

This was accomplished by converting the Taylor MOD 300 database into Visio drawings where Controltech engineers could graphically see how the modules and blocks connected. This enabled exporting the database to a format that allowed conversion to DeltaV modules through the DeltaV software's Microsoft Excel bulk edit feature. McManus adds "We were able to import portions of the database so that certain features from the old system could simply be imported into the new one."

I/O simulation

Once ensured of the hardware system's integrity, Nexen needed to verify that the I/O would work on startup. Using Mynah™ Technologies' MiMiC software during the factory acceptance test at Controltech's assembly facility, Nexen was able to simulate the I/O and verify how the logic would perform.

Conversion & startup

During the conversion, Controltech pre-mounted all the new equipment beside the existing equipment, and started up the new system in a temporary control room that would allow reversion to the old system in the event of any roadblock to the scheduled three day shutdown and conversion.

Minimal operator training

By including plant control operators in the transition process, Nexen saved on training. Because the plant was operating and the operators were involved with the simulation and startup, they had a good feel for how the DeltaV system's Windows-like operator interface was going to operate. Additionally, most of the graphics were reconstructed to closely resemble those of the system it replaced. McManus, who attended two weeks of formal training at Emerson's Austin training center, says, "Two weeks was enough to get me going on the basics."

"I just shook my head. On top of the 1200 I/O from the old Taylor DCS there were two boilers, and I've been on boiler startups where it's taken one week for a single boiler, so to do two boilers with triple fuel headers plus a 1200 point I/O system in three days was very optimistic. But as it turned out nobody had to do any night shifts. We were all home by supper or by eight or nine o'clock at the latest. During the I/O checks we had virtually 100% success testing every point."

Warren Sawatsky

Instrumentation Technician, Controltech



Improved control features

Dual screens at the DeltaV system's workstations gave operators a better look at the process as well as better control.

The system's auto tune capability was beneficial in re-tuning some of the loops, as Nexen found out. Tuning constants are not always calculated the same from one system to another, so best-guess efforts at converting the numbers from the original system to the DeltaV system were not always correct.

The digital system's embedded historian gave Nexen process information that helped not only on the plant floor, but also in the business office.

Remote access has also allowed Nexen to get troubleshooting and support from Controltech's Winnipeg offices, as well as from Emerson Process Management's Austin headquarters.

Immediate expansion

With the digital automation system's initial transition and startup success, Nexen used it in an expansion project, where it integrated with smart field devices and fieldbus technology for enriched process information and installation savings.

Notes McManus, "Part of the reason for the fast-tracking of the conversion project was the fact that we were going to be doing a plant expansion, where our intent was to use FOUNDATION fieldbus as well as DeviceNet for all the interlocking."

When the motor control center (MCC) panels were ordered for the expansion, they came pre-installed with DeviceNet, so rather than run every device back to a network, a single network cable plugged into the MCC connected all the instruments, for huge time savings and contributing to the new plant being brought online to full capacity in a mere five days.

Increased reliability & efficiency

The enriched process information provided by the DeltaV digital automation system and fieldbus has given Nexen the updated automation solution—along with the incremental process efficiencies it was looking for. No unplanned shutdowns have occurred since the system's installation. Says plant manager Bill Turner, "If we do any major modifications to a plant we would be going with DeltaV." Adds Garay, "Without a doubt, we have been able to make some big improvements in both operating costs as well as reliability. Those improvements we effected by having the information available to make good decisions."

"The historian is very useful in day-to-day monitoring and troubleshooting the process as well as longer-term continuous improvement projects.

They have set up remote access into the file historian from the corporate office in Calgary, where they are able to take a look at the current running data from the plant."

Ed Garay

Senior Process Engineer, Nexen Chemical

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