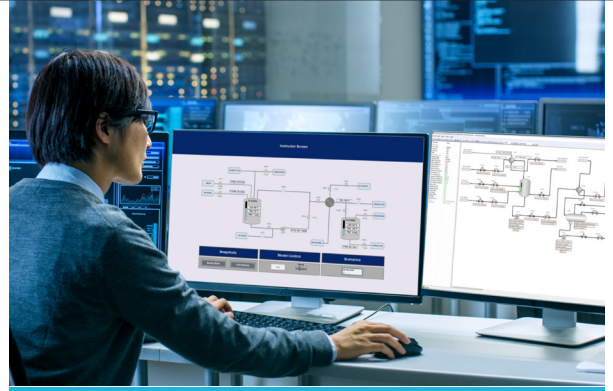


Polysilicon Plant lays groundwork for impactful innovations and personnel readiness by implementing a digital twin

RESULTS

- Personnel prepared for day-one operation and for changes to the processes
- One month in estimated savings during startup
- Innovations can be developed without impacting process execution
- Digitalization journey begun and people transformed and ready



APPLICATION

Facility in Inner Mongolia province uses Emerson's digital twin, including DeltaV™ Simulate and DeltaV Mimic, to simulate entire units of the plant including chlor-alkali, cold hydrogenation, and rectification.

CUSTOMER

The company researches and develops products such as silicon-based materials and advanced ceramics to create a better future with new energy sources and materials. The plant develops high-purity electronic-grade polysilicon, which contributes to green-energy sources.

CHALLENGE

With rapid growth in polysilicon manufacturing, process optimization, and frequent personnel changes, the company needed a platform on which to train the team in the most up-to-date process. Their goals included making sure new and existing employees understood the process changes and strengthening their response to emergencies.

Project goals also focused on encouraging the team to be innovative. The company wanted their personnel to design or revise control strategies and processes confidently in an offline production system with no risk to the live process. The team then would be able to test, verify, and optimize ideas before going live.

"We recognize that creating a digital twin enables our personnel to be ready for changes and advances. The digital environment gives us the power to innovate for our customers."

Automation Manager

SOLUTION

Working with the client, Emerson created a digital twin solution, DeltaV Mimic dynamic simulation software, that models the facility's evolving physical environments and processes. This power enables the plant to perform advanced testing and train operators without affecting the processes in operation.

To prepare personnel for full operation, the team designed and implemented 50 pre-set process scenarios that each can include up to 30 scoring conditions. Since training began before the process did, the facility saw benefits right away upon startup. Because the team is well trained, they are familiar with the operation of the process control system. When the control system came online, the team was ready.

The transition from commission to operation was easier and quicker than expected. Emerson estimates that the digital twin saved approximately one month during startup. As the system was designed, personnel used the digital twin to envision how best to design the control strategy, and they used the operator stations to test process features and prepare for commissioning. As a result, the client kicked off their digitalization journey and continues to transform personnel with confidence in digital technologies.

Moving forward, continued innovation will be more efficient as well. Engineers and innovative personnel can test ideas using the flexible modeling delivered by the digital twin. In addition, the client has begun to benefit from higher performance based on the use of State Based Control (SBC), which uses automation and dynamic alarm management to create a safer environment and reduce unplanned events.

A state-based approach to control uses a combination of operator-initiated state transitions and automated control logic to enable operators to drive a process to a desired state. Using SBC, the client can stay in automatic operation during future startups, shutdowns, and abnormal situations, while keeping within the operational boundaries and away from alarms and trips. If a trip occurs, the units can have a coordinated response to minimize operator interventions.

“As the global polysilicon industry grows, we are delighted to be ready to help communities adopt green power. As we improve our processes, we improve the availability of polysilicon material for solar-power applications.”

Automation Manager



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