Pharmaceutical Company Assures a High-Quality Process while Saving Material and Time with Digital Twin

RESULTS

- Saved 114K pounds of raw materials by testing runs in the simulated environment
- Saved $552K in raw material and waste handling by simulated testing
- Addressed 50 issues before commissioning

"The manufacturing team used DeltaV™ Mimic to successfully learn and verify the column packing skid clean in place (CIP) recipe. These activities helped us complete the SOP ahead of schedule."

Manufacturing Supervisor

APPLICATION

Purification process for a vaccine component.

CUSTOMER

The company portfolio spans vaccines, specialty medicines, and general medicines. One of their local US facilities creates a vaccine component, adjuvant, capable of stimulating the immune system of vaccine recipients.

CHALLENGE

To produce its proprietary adjuvant technology in the US, the company constructed a new building for the purification process that would require running the vaccine component through a series of preps, chromatography columns, an ultra-filtration system, and a lyophilizer before sending the material to storage.

The team goals included being able to test full batch runs of the entire process without using raw materials. They also wanted to accurately develop standard operating procedures (SOPs) and fully educate their operators before operation began. To reach their goals, they recognized that they needed an offline simulated-plant environment.

They also recognized that the digital environment would need to smoothly interface with Emerson's DeltaV™ control system, Rockwell smart skids, and instrumentation from a variety of suppliers.

For more information:
www.emerson.com/deltavmimic

EMERSON™

SOLUTION

The pharmaceutical company, Emerson, and Emerson's Impact Partner Applied Controls worked together to design the digital twin solution to ensure it accurately modeled Emerson's DeltaV control system interaction with the multiple smart skids controlled by Rockwell systems. As shown in the illustration, for simulation purposes, the DeltaV Mimic digital twin replaced all equipment in the purification process. The simulated system could run a complete batch and test the entire communication path along the way.

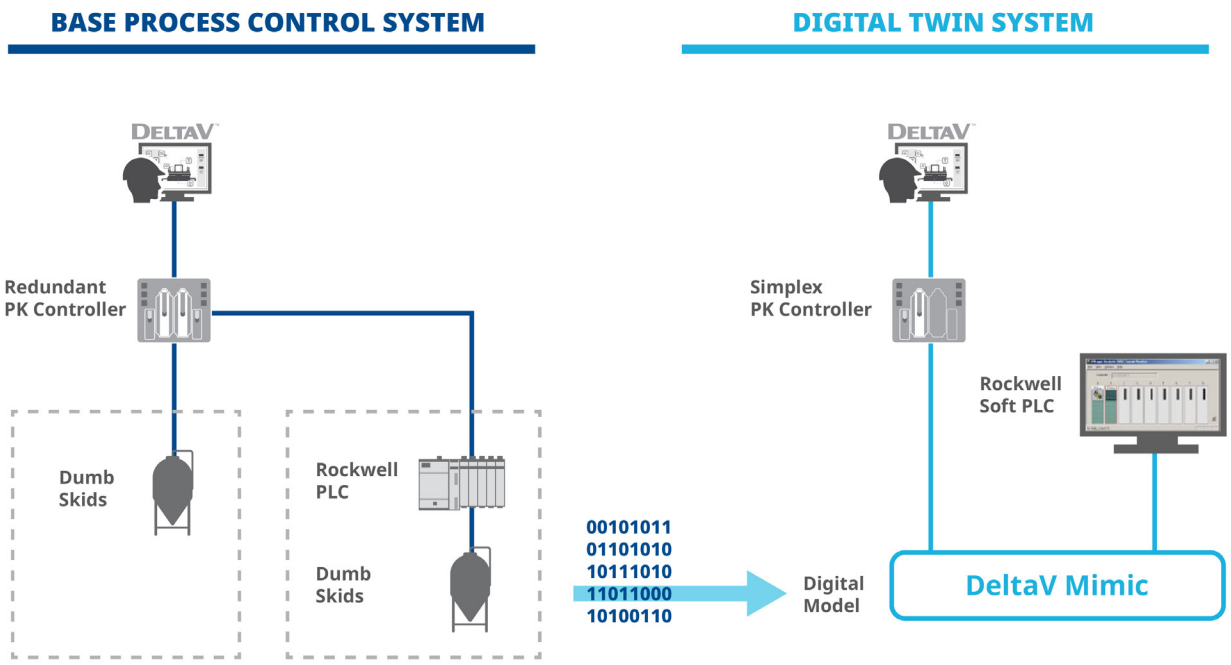
Testing the entire purification process in the digital twin environment was critical to success and helped the team develop SOPs. In fact, they could test the SOPs as they wrote them, then train the operators to use them. As the process changes in the future, operators can adapt to the new process in a simulated environment, without waste and without stopping production.

Testing on the digital twin also helped the engineers work out issues, simplified collaboration among the project partners, and enabled the creation of a more robust system. The company estimates that they saved more than double the predicted time to carry out SAT and commissioning activities. They also estimate that by using the digital twin, they solved around 50 issues before startup.

The team found benefits with the digital twin, specifically, as they tested the chromatography column and all the related collection points. The team could — on a simulated batch run — generate UV curves that helped them assess the collection steps. If any errors occurred, they could recode the run and get closer to the mark. All this was done without needing any water or wasting any materials. In addition, because the team could evaluate the integration among the units during simulated batch runs, they could make sure it was successful — again, without waste.

"The DeltaV Mimic digital twin not only saved us time, it helped us save almost 115K pounds of raw material by enabling us to perform troubleshooting and test runs in the simulated environment rather than in the production system."

Automation Engineering Lead



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