Dual Installation of FIELDVUE™ DVC6200 SIS Smart Positioners Increased Safety and Profitability

RESULTS

- Extended the partial stroke test frequency while maintaining the required safety integrity level of the system
- Reduced input/output count by 60%
- Met separate valve-closing interlock safety instrumented function SIL 2 needs
- Maximized process uptime with inherent spurious trip mechanisms, saving up to $4 million USD per day

The installation of the FIELDVUE DVC6200 SIS smart positioners on critical isolation valves decreased the partial stroke test frequency from once every two weeks to once every six months, significantly lowering the cost of maintenance.

APPLICATION

Safety shutdown in a high integrity pressure protection system (HIPPS)

CUSTOMER

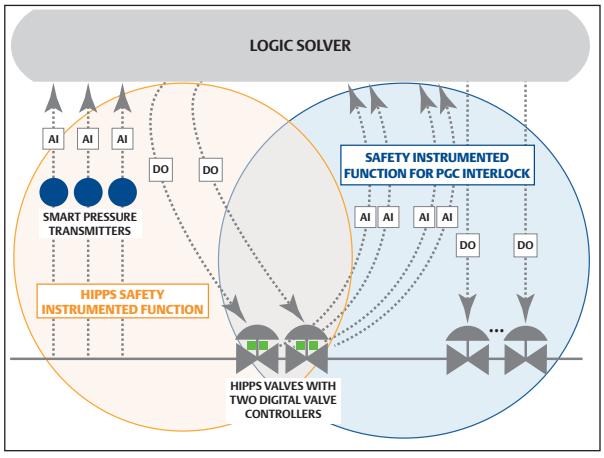
An olefins plant in the Southern United States

CHALLENGE

Plant personnel installed a HIPPS between stages of a process gas compressor. The system senses over-pressure from backflow and closes redundant isolation valves. It also isolates the hazard at the source with high-safety integrity and protects the downstream compressor.

When designing the HIPPS at this plant, the consequences of a spurious trip were considered. A spurious trip of either valve, even without tripping the process gas compressor, could produce high pressures and vibrations, violent surge, and serious damage to the compressor internals. Equipment damage could result in a process shutdown, costing up to $4 million per day. To address this, a SIL 2 valve-closing interlock was required, in addition to the HIPPS, to trip and protect the compressor in the event of spurious valve closure.

The original installation included redundant triple offset butterfly valves operated by multiple solenoid-operated valves (SOV) with limit switches. However, with multiple SOVs, the partial stroke test could not be completed in a timely manner and in some cases, the valve failed to move during a test. Also, there was no diagnostic capability, no means to monitor specific valve position, and there were too many valve input/output (I/O) counts to maintain.



Updated architecture for HIPPS and PGC interlock with two digital valve controllers installed on each HIPPS valve.

FISHER™

EMERSON™
Process Management

SOLUTION

Only one instrument is required to perform partial stroke testing and SIL 3 capable safety shutdown function. However, the HIPPS design was updated to include two Fisher™ FIELDVUE DVC6200 SIS digital valve controllers with integral position transmitters on each HIPPS valve to provide a SIL 2 valve-closing interlock sensing function. The digital valve controllers alert operators, should either valve close spuriously. Also, the redundant digital valve controllers sense valve position independently and transmit to the logic solver for the valve-closing interlock function.

The dual digital valve controllers were preconfigured, precalibrated, and hooked up pneumatically with a selector panel. The panel enabled operators to easily change between primary and secondary valve control, in case additional availability was required. Detailed diagnostics and means to prevent spurious trips inherent to the digital valve controllers provided operators with confidence to perform partial stroke tests.

The new HIPPS design simplified field installation and improved reliability and availability of the over-pressurization protection of the safety system. The plant safely runs longer between unit shutdowns and performs partial stroke tests less frequently. The partial stroke tests provide visual indication of the valve health over time and the results are stored in the digital valve controllers. The valve diagnostics have enabled a more proactive maintenance strategy, reduced maintenance costs, and minimized business interruptions.

FIELDVUE DVC6200 SIS positioner on a Bettis™ actuator.

RESOURCES

Product Bulletin: Fisher FIELDVUE DVC6200 SIS Digital Valve Controller
http://www.documentation.emersonprocess.com/groups/public/documents/bulletins/d103555x012.pdf

http://www.Facebook.com/FisherValves
http://www.YouTube.com/user/FisherControlValve
http://www.Twitter.com/FisherValves
http://www.LinkedIn.com/groups/Fisher-3941826

Emerson Process Management
Marshalltown, Iowa 50158 USA
Sorocaba, 18087 Brazil
Cernay, 68700 France
Dubai, United Arab Emirates
Singapore 128461 Singapore
www.Fisher.com

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D352572X012 / MCC32 / June 2016