

Environmental stewardship and regulatory compliance

A case-study using Norriseal Series 2200 control valves equipped with Tritex II™ electric actuators from Norriseal WellMark

When the state of Colorado capped production based on fugitive emissions volumes a Denver based exploration and production company went to market for solutions. This case study details how this company not only met their fugitive emission targets using Norriseal Wellmark products but also achieved significant and measureable cost savings in the process.

Pneumatic controllers

All pneumatic controllers vent a small amount of gas to the atmosphere after it is used to energize a dump or control valve. However, with constant devices, the bleed gas - the gas that leaks to the atmosphere between dump cycles – is much higher in volume and poses the greatest risk of exceeding regulatory limits on greenhouse gases. The U.S. EPA has mandated that companies operating in the Oil and Natural Gas Sector (who typically use natural gas to power pneumatic controllers) must use controllers with bleed rates no greater than 6.0 scfh.

Upon investigation, it was found that a large source of emissions at the facility were attributed to pneumatically operated valves in the CPF (Central Processing Facility) and gas lift injection applications. Pneumatic actuators in this application generate high emissions because the valves are continuously cycling and have a constant bleed rate. The client reported emission losses at 6192 cfd from the 150 valves associated with their gas lift application. Pneumatically actuated valves were also an ongoing reliability problem at the site. Located at the wellhead without access to instrument air, the valves ran on wet gas and supply lines often froze in winter, shutting down the gas lift operation. Rich gas in the field occasionally carried entrained liquids, which damaged the valves and caused more downtime. Repair rates for these valves averaged 30% of the total product costs.

The solution

Beginning in 2014, the client began replacing 150 pneumatically controlled valves in their gas lift injection application with Norriseal Series 2200 control valves equipped with Tritex II™ electric actuators. In 2016, installation of the Norriseal



Norriseal WellMark valves and actuators installed at client site

Series CBV 2500 control ball valve also commenced, in this case also fitted with Tritex II™ electric actuators as a suction control valve in one of their CPFs.

Although purchase prices for pneumatically and electrically actuated valve packages are comparable, total installed costs were found to be substantially lower for electric valve

packages when all costs are considered (Fig 1.). The new electric actuator and valve packages were found to control emissions but also operate at lower cost due to lower installation costs, a reduced need for maintenance, higher gas recovery rates, decreased downtime and improved production due to a more precise valve control.

Figure 1: Installed costs

	Pneumatic	Electric
Purchase price	Comparable	Comparable
PID Controller	\$2,500	\$0
Fuel scrubber	\$10,000*	\$0
Installation Labor	\$2,000	\$750
Total ancillary costs	\$14,500	\$750
Total cost savings for 150 valves: \$552,500		
*One scrubber may handle multiple locations (typically 6 valves per scrubber. 25 scrubbers with 150 valves)		



Norriseal WellMark's Electric Actuator

Emissions Savings

The client reported zero emissions and greatly improved operation from the electrically actuated valves. Compared to previous pneumatic valves, the company

Figure 2: Savings at a glance

Value of recovered emissions (6.192 MCF @ \$ 1.79 CU FT)	\$11,083
Revenue increase from higher production cap (2000 bbl @\$32.78bbl* 30 days)	\$1,966,800
Valve repair costs eliminated	\$93,750
Routine maintenance savings	\$51,840
Value of production increase from scada control	\$ 40,000
Total annual savings	\$2,163,473



Close view of the valve and actuator in action

is preventing approximately 2000 mcf per year in fugitive emissions, with a current annual value of \$1,966,800. The reduction in emissions has resulted in an increase in the state-regulated production capacity, potentially adding 10% production. Not only were emissions saved by preventing the release of bleed gas into the atmosphere, it was found that personnel safety, especially in closed environments, was an added benefit as well.

Maintenance Savings

Pneumatic valves required approximately \$51,840 in routine maintenance each year. To date the new valves installed have required no maintenance. With electrically actuated valves the client experienced a 70% improvement in

downtime. Replacement costs for damaged valves dropped to zero.

Control and Productivity

Electric actuation has allowed the client to incorporate the valves into their SCADA system. Subsequent improvements in monitoring and control have increased production, adding an estimated \$40,000 worth of production per year.

The enhanced cost efficiency and increased production at the client site demonstrate how properly applied green technology can also benefit a company's bottom line. The client has since declared that they will looking to use electric actuation for any control valve that requires a PID loop.

About the author

Jawad Qasimi is Director of Sales & Marketing at Norriseal Wellmark (a Dover Company) in Houston, Texas. He has previously worked for Eaton Corporation and Honeywell International.

