VUE TO SUCCESS

A Publication of the FIELDVUE® Instrument Team

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FIELDVUE® DVC6000 Instrument Wins 2006 Emerson Technology Award

Fisher® FIELDVUE® digital valve controllers received recognition for FY06 performance from two important sources— parent-company Emerson and worldwide customers. The FIELDVUE DVC6000 Series instrument was one of only two products chosen to receive the 2006 Emerson Technology Award, recognizing market leadership and innovation. Customers worldwide expressed their confidence and preference for FIELDVUE instruments by ordering a record number of units.

Alfred Lee, director of the FIELDVUE instruments program, said, "The FIELDVUE digital valve controller was the first intelligent positioner of its kind on the market, and the product continues to set industry standards for innovation, quality, and reliability."

Bruce Grumstrup, director of business development - FIELDVUE instruments, said the DVC6000 Series instrument won the 2006 Technology Award amid more than 500 new Emerson products. "The criteria for selection included the product's originality and importance to the industry," he said. "So far, FIELDVUE instruments have earned 18 separate patents— and counting."

FIELDVUE instruments, incorporating digital communications and diagnostics, were designed for use with Fisher and non-Fisher valves and with AMS™ ValveLink® Software. Design engineers continue to enhance the product, now available in HART® and FOUNDATION™ fieldbus communication protocols. FIELDVUE instruments are rated for use in hazardous areas, Safety Instrumented Systems (SIS), and nuclear power plant applications. FIELDVUE instruments are critical components of Emerson's industry-leading PlantWeb® architecture, and they have an excellent record of reliability . . . and results.

Emerson Process Management teams, like the one pictured above, are hard at work collaborating with global design and manufacturing locations in new product research, development, and enhancements for industry-leading instrument product lines.

FIELDVUE® DVC6000 Accomplishments

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Generally, the higher the diagnostic tier implemented, the greater the cost savings realized.

Danny Nelson, vice president of the Instruments Business Unit, says technical support is another reason users value FIELDVUE instruments. “Given the multi-tiered benefits of FIELDVUE instruments and field-based control systems, our engineers and champions work with customers to take advantage of diagnostic capabilities and achieve the benefits of improved control and predictive maintenance.”

Danny added that planned enhancements to the FIELDVUE product line, including emerging wireless technology, will enable Emerson to further differentiate itself and its digital valve controllers.

Products

Enhancements Add Value to DVC6000 SIS Series Device

Firmware 7, used with AMS™ ValveLink® Software 7.3.1, has brought exciting new features for the DVC6000 SIS (safety instrumented systems) Series.

Emerson’s digital valve controller offers many advantages including: local control panel (Fisher® LCP100), automatic PST (partial stroke testing) capabilities within the device - including PST at 4 mA current and support for Performance Diagnostics (PD), solenoid valve testing for improved reliability of the loop, spurious trip protection to allow increased availability, manual reset to lock the valve in trip state, trigger functionality to record trip event, signature analyzer with easy-to-understand diagnostics, and enhanced tuning for valves mounted with assessories.

These features illustrate why DVC6000 SIS Series instruments continue to deliver value to industry leaders. During 2006, DVC6000 SIS instruments were applied in refineries in Saudi Arabia, South Africa, Mississippi (USA) and Kazakhstan -- to name a few.

Technical Tips

What’s Your Valve’s Minimum Operating Point?

All control valves have a minimum operating point, which is usually 10% opening. For valves with anti-cavitation trims, the minimum operating point varies with trim design and may be specified for each cage.

If a valve is allowed to throttle below its minimum operating point-pressure staging will not occur. Instead, the entire pressure drop will go directly across the seating surfaces of the valve’s plug and seat ring, causing localized cavitation and erosion damage.

When the “Low Travel Cutoff” feature in the FIELDVUE® digital valve controller is enabled, it prevents the valve from throttling below the recommended minimum operating point and enables you to use the instrument as a valve stem positioning device.

Pay attention to the minimum operating point when selecting, configuring, or operating control valves, especially those with anti-cavitation trims. Refer to instruction manuals: DVC6000 AC, HC, AD, PD, and ODV – Form 5647 (January 2007), page 5-11; DVC6000f – Form 5774 (March 2006), page 5-28; and DVC2000 – Form 5772 (September 2006), page 4-9.

DVC6020 Cam Adjustment Tool

The FIELDVUE® instrument team has designed a DVC6020 Cam Adjustment Tool. The part is currently available through FAST parts. This tool will help a technician properly adjust a DVC6020 cam without referring to the potentiometer count values shown in AMS™ ValveLink® or the HART® communicator. Instructions will be shipped with the product. Contact your local sales office with any questions. Refer to part number GE12742X012. For instructions, refer to part number D103276X012.

In-Line FIELDVUE® Instrument Repair Prevents Shutdown, Saves Shell Refinery $625K

UNITED STATES

Control valves in the hydrocracker unit (HCU) at the Shell Refinery in Deer Park, Texas are critical to overall plant performance. These valves face demanding conditions including high temperatures and high-frequency vibration. The failure of any one HCU valve may force the shutdown of the entire unit.

Fortunately, Shell uses a combination of FIELDVUE® digital valve controllers, AMS™ ValveLink® Software, and FOUNDATION™ fieldbus communications to monitor the performance of these critical valves. These resources alerted Shell operators to travel sensor failures, prevented a shutdown, and saved the facility an estimated $625,000 USD.

Over time, vibration had damaged the potentiometer and worn a half-moon in the FIELDVUE instrument's travel feedback arm. (Fig. 1) The valve could not hold the set point in the affected area. Through AMS ValveLink Software, the digital valve controller sent alerts while it tried to find acceptable potentiometer counts outside the bad area on the pot. As the magnitude of process upsets increased, Shell contacted the local Emerson sales office (Puffer-Sweiven) for assistance.

Working with the Shell instrument technicians, Jim Pfeil of Puffer-Sweiven developed a fix strategy to return the FIELDVUE instrument to like-new condition — *while keeping the unit operational*. The plan enabled them to replace the housing and potentiometer in-line and retain the calibration and tuning "guts" of the existing digital valve controller. (Fig. 2)

The service team mounted a FIELDVUE DVC5010f (fieldbus) instrument on a cavitating competitor's valve without disturbing the process. Specifically, they (a) used a hand wheel to lock the valve in its current operating position and slowly removed the air pressure. (b) Once the valve was stabilized, operators in the control room noted its position feedback and pot count (via AMS ValveLink Software) for matching later. (c) Next, the service team removed the damaged FIELDVUE instrument without disturbing its travel feedback assembly arm. (d) Opening the device, they replaced its housing and potentiometer, saved the existing puck and front module, and re-installed it on the valve and existing feedback arm assembly. (Fig. 1) (e) When the installation was complete, they adjusted the pot position to match the previous travel feedback and pot count. The digital valve controller controlled within 0.5% of the previous set point without re-calibration.

The valve is now controlling without causing any alerts or process upsets. Jim said, "Changes in refinery process conditions can put valves in applications they were not designed for. The resulting high-vibration can wear out a potentiometer in short order. The success of this hot-switch project has expanded opportunities for in-line repairs of other critical valves that cannot be stroked while process units are operating—and saved the refinery money."

Fig. 1

Fig. 2

FIELDVUE® SIS Instrument Monitors Refinery's snort Valve

Managers of a refinery in Memphis, Tennessee have gained confidence in valve monitoring capabilities and benefits. They became believers after applying a FIELDVUE® DVC6000 Series instrument to a critical snort valve in their fluidized cat cracker (FCC) unit.

The 24-inch Fisher® 8532 butterfly-style valve is closed unless called upon to relieve pressure build-up and assist in protecting the facility's valuable 30,000 horsepower compressor. In the past, operators manually checked the valve by fingering its 546 I/P and watching gauges as the pressures balanced around the size-80, 1061 piston actuator. Because of the valve's importance, maintenance managers needed a better way to test its performance as well as improve its reliability and safety.

After discussing the application with Emerson's local business partner, VRC Company, refinery personnel ordered two FIELDVUE DVC6000 Series instruments with Performance Diagnostic (PD) and Safety Instrumented System (SIS) capabilities. (One of the

instruments is a spare.) Working in combination with a 32-tag ValveLink® Solo software package, the SIS instrument enables the maintenance team to conduct on-line, partial stroke tests from the comfort of the control room and to more easily document the snort valve's fast, accurate stroking.

Zac Scott of VRC said the FCC unit is a Class I, Division II area where high temperatures and friction can be a challenge for lubrication fittings. "Adding a DVC6000 SIS instrument to this valve has given the maintenance team proof of valve movement and peace of mind," he said. "In this case, change is good."

Remote Mount FIELDVUE® PD-Tier Instruments Monitor Refinery's Critical Coker Valves

A refinery in California will be replacing six existing non-Fisher valves in its Coker unit. Emerson Process Management and its local business partner (Caltrol) will supply new, twelve-inch Fisher CV500 valves with C5 bodies, Bettis actuators, and FIELDVUE instruments for this demanding application. Two of the valves are for modulating service and four will be remotely operated.

Brian Pitcher of Caltrol said this is the first in a series of orders from the site, focused on unit improvements and two major outages (maintenance turnarounds) coming in June and October 2007. "We (Emerson) will provide a total of sixty new control valve assemblies as well as installation services," he said. "The 'frosting on the cake' is that all of the valves will be fitted with PD-tier FIELDVUE digital valve controllers."

The Coker unit in a refinery is an extremely harsh environment where coke dust accumulates on every piece of equipment in the area. Historically, valves have been extremely unreliable in this dirty, high-temperature environment. In an effort to lengthen the life of Coker valves, the Emerson team came up with a plan to remotely-mount the FIELDVUE instruments and peripheral accessories in a fiberglass enclosure, 30 feet away from the harsh environment. The DVC6000 Series instruments with Performance Diagnostic (PD) capabilities will enable on-line control and monitoring of these critical valves, as well as provide timely data on their performance for more predictive maintenance.

Brian said, "Maintenance personnel at the site see our remote-mount option as a new approach to a long-term, costly, and aggravating problem. They expect the new Fisher valves to improve control and reliability in the Coker unit."

RUSSIA

Emerson personnel in Canada and Russia won a large Sulphuric Acid Plant automation project through an acid plant technology supplier and constructor from Toronto, ON, Canada. The acid plant will be built at a copper smelter in the Russian Federation.

The $1.5M USD PlantWeb® solution features more than 200 FOUNDATION™ fieldbus instruments including 50 FIELDVUE® digital valve controllers. Plant managers and EPC personnel agreed to standardize on FIELDVUE DVC6000f (fieldbus) instruments, which will be used on specialty (plastic) valves and dampers. The Project Solutions group at Lakeside Process Controls (Emerson's local business partner) in Vancouver worked with the Moscow office, promoting the benefits of fieldbus technology. Rajiv Anand of Lakeside said, "The benefits of our diagnostic and alert capabilities, as well as our local support, were the key reasons they chose Emerson for this project."

The plant will be operational in late 2007.

New Literature

Instruction Manual . . . FIELDVUE® DVC2000 Series Digital Valve Controllers (September 2006). This update includes new information about mounting, advanced setup, and calibration, as well as other miscellaneous topics. The instruction manual part number is D103176X012.

Bulletin 62:1 . . . DVC6000 SIS (September 2006). This new, stand-alone document represents a complete rework of the DVC6000 SIS bulletin. Information about the Local Control Panel, LCP100, as well as complete specifications and dimensional drawings. The bulletin part number is D102784X012.

Celulosa Pulp Mill Upgrades to FIELDVUE® Instruments

CHILE

CMPC Celulosa, the oldest paper-producing company in Chile, has a long-standing tradition as a reliable supplier of pulp to foreign markets. Its Pacifico mill south of Santiago produces bleached softwood kraft pulp using only man-planted forests.

The pulp-making process, involving continuous recycling of raw materials, is a difficult and dirty application for control valves. Wood chips are delignified by harsh chemicals (white liquor) to produce pulp and a spent mixture of the cellulose fibers (black liquor) is cooked out of the wood. (The black liquor is later regenerated to white liquor in the causticizer.) The black liquor, or pulp mixture, is a thick, viscous slurry that coats and potentially clogs anything in its path.

Valves in this service must withstand high temperatures, highly-caustic fluids, vibration, and pressures up to 1,700 psig. Yet, in the midst of these harsh conditions, the reliable performance of control valves is critical to maintain the overall "flow" of the process.

In an effort to improve valve performance and monitoring, the Pacifico mill began upgrading its conventional valve positioners to FIELDVUE® digital valve controllers. Specifically, they installed more than 65 FIELDVUE DVC6000 Series instruments with Advanced Diagnostics (AD tier) and HART® communicating (HC tier) capabilities. The units were applied to existing Fisher® and non-Fisher valves that control critical processes in the digester, recovery boiler, evaporators/concentrators, filtration lines, recausticizing area, lime recovery, and consistency tower.

David Soto, lead instrumentation engineer for CMPC's Pacifico mill said, "Applying FIELDVUE instruments have given our operation and maintenance personnel more confidence and security regarding control-valve performance. The instrument's diagnostic capabilities provide information for more proactive maintenance as well as improve the speed and accuracy of our troubleshooting activities."

David Portilla of INECO, Emerson Process Management local business partner, shared one specific example. Vibration had damaged the internal works of a (Neles ND800) positioner, requiring replacement parts and frequent re-calibration. "The competitor's positioner had been installed less than two months when these problems began," David said. "In contrast, the replacement FIELDVUE instrument and its rugged mounting kit have withstood the vibration and so far provided one year of maintenance-free service."

Two instrument technicians, one from INECO (red hat) and one from CMPC-Pacifico (white hat), used a handheld device to calibrate a new FIELDVUE® instrument installed on a valve in the filtrate lines at the base of the pulp mill's consistency tower.

AUSTRALIA

Southern Controls, Emerson's local business partner in Victoria, will supply 65 GX, e-body, and V200 valves with FIELDVUE® DVC6000 Series digital valve controllers for Qenos. Qenos, formerly called Kemcor Australia, operates petrochemical complexes at Altona and Botany, New South Wales, with a combined production of 500,000 tpa of ethylene.

In April 2006, Qenos announced that the SCAL-1 plant in Altona would be converted to Ethane and LPG feedstock. The Altona conversion project completed a similar conversion at the company's Olefins operation in Botany in 1996 and strengthened its future as Australia's leading polyethylene supplier. The newly converted SCAL-1 facility also contributes to the plant's safety and environmental commitments by reducing energy consumption and producing fewer greenhouse gases and solid wastes.

FIELDVUE® PD-tier Instrument Improves Valve Performance on Heavy Oil Upgrader

VENEZUELA

Petrolera Ameriven is a young company that started operating three years ago. They use FIELDVUE® digital valve controllers and AMS™ Device Manager software on an extra heavy oil upgrader plant in the Jose Antonio Anzoategui Industrial Complex in Venezuela.

In January 2005, a non-Fisher® 20-inch rotary pressure control valve with a SVI I positioner was causing problems on a 140,000 barrels per day crude oil pipeline. Installed in a tall tower, the valve was hard to reach. Maintenance personnel suspected that its actuator was not strong enough to control flow through the valve body. They planned to purchase and install a larger actuator.

Instead, Emerson Process Management's local PlantWeb® services engineer convinced them to replace the positioner and use the FIELDVUE instrument's diagnostics to determine the root cause of the problem. Petrolera Ameriven personnel agreed, and a FIELDVUE DVC6030 unit with Performance Diagnostic (PD tier) capabilities was installed on the valve.

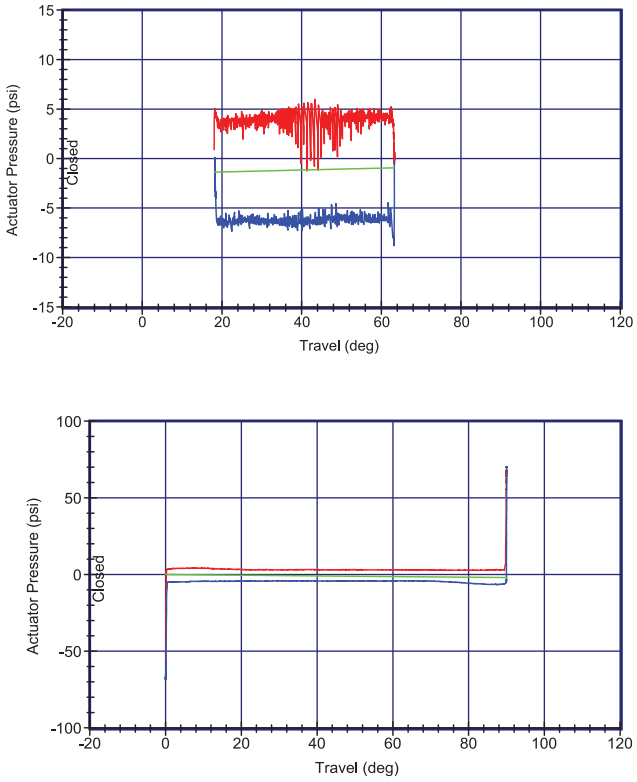

Fig. 1. Valve Signature, Tag 10PV153. Top: As-found condition. Bottom: Condition after correcting pneumatic problems and positioner tuning.

Performance diagnostics technology enabled the maintenance team to prove:

a) The actuator was able to provide the required control force and was strong enough to move the valve disk as required.

b) The most serious problem was on the pneumatic array associated with the control valve. By observing the input and output air pressures from the valve performance signature curves generated, abnormal pressure drops were detected. Abnormal air conditions were corrected by replacing some pneumatic accessories and tubing.

c) The FIELDVUE digital valve controller and corrective actions dramatically improved valve performance, process control, and reliability.

The customer saved an estimated $40K USD by not replacing the actuator. Later that same year, they ordered 70 additional FIELDVUE instruments to replace competitors' positioners. The team from Emerson Venezuela, C.A. is pursuing a project to install additional FIELDVUE DVC6000-PD tier instruments around the upgrader.

The valve signature curves at left were obtained before and after installing a DVC6030 instrument on a non-Fisher, 20-inch rotary control valve. Petrolera Ameriven was fully satisfied with the results and will standardize on FIELDVUE digital valve controllers around the upgrader.

2007 Emerson Exchange in Texas

In 2007, the conference is early, September 10th - 14th, at the Gaylord Texan Resort on Lake Grapevine outside of Dallas, Texas. Mark your calendars and plan to attend. The focus of the 2007 conference is the significant role that the engineering disciplines play in shaping the process control industry's future.

FIELDVUE® DVC6000 Instruments Set Standard for Tough Oil Sands Applications

CANADA

The rich oil sands of northern Alberta and British Columbia represent an unusual challenge for control valves. Improvements in horizontal drilling and new processes, such as steam-assisted gravity drainage (SAGD), are more environmentally friendly than traditional mining operations, but still represent harsh and technically demanding applications. Many of the valves applied in oil sands operations include innovations such as FIELDVUE® digital valve controllers for performance monitoring and NotchFlo® dirty service trim (DST).

Emerson's local business partner, Spartan Controls, in Alberta not only serves customers on the front-line of the oil sands industry but also supports Emerson product innovations. Recently, Emerson and Spartan engineers worked together to develop an actuator and positioner assembly for a particularly harsh environment — scavenged middlings.

The customer uses a hydro-transport process to move recovered oil sands through a pipeline to a Primary Separation Vessel (PSV). In the PSV, the oil separates from the sand into three different components:

- heavy oil or bitumen, which goes to an upgrader to be refined
- middlings — a combination of water, sand/gravel, and heavy bitumen, which goes to the Scavenger Bank for continued separation, and
- tailings or wastes, which goes to the tailings pond.

Feed rates to the Scavenger Bank vary from 15,000 to 25,000 gpm and, of course, the goal is to recover as much bitumen from the middlings as possible. An agitation process is used to further separate the bitumen from the sand/gravel mix, but it leads to a host of problems and poor DART valve control:

- Lag time and variability resulted from feed volume changes.
- Middling gummed up the external return spring in the pneumatic actuator, reducing its ability to stroke the valve.
- The controller provided an insufficient output signal to the actuator.

With FIELDVUE instruments performing well in other applications on site, the end-user ordered DVC6000 Series digital valve controllers with Advanced Diagnostics (AD tier) and Fisher® 480 actuators for all 14 of the DART valves in the Scavenger Bank. They saw an immediate improvement in the performance of these valves as well as in the control of the scavenger cell overall. In fact, the engineering department estimated the savings at $1.3M per year as a direct result of the actuator and digital valve controller upgrades.

The end-user was also able to recover more bitumen, reduce the output of tailings, and demonstrate and document a lower impact on the environment (to meet government regulations).

Chong Teng, Spartan's technical sales specialist for the Fort McMurray territory said, "This project illustrates why FIELDVUE digital valve controllers are the standard for this site and will be replacing thousands of pneumatic positioners."

PAKISTAN

A joint venture project for a new textiles mill in Pakistan features Fisher® valves and FIELDVUE® instruments from Emerson Process Mangement. The USA-based partner, a leading manufacturer of quality terry cloth, will supply the technology and experience in fabric dyeing and finishing. The other partner, based in Pakistan, provides the labor for the new plant, manufacturing bath towels for hotel chains around the globe.

For its part, Emerson will supply controls and instrumentation to upgrade equpiment at the rebuilt mill. The project includes a 600-PST DeltaV™ automation system, Fisher and Baumann™ control valves and desuperheaters for steam, acid, caustic, and water applications; FIELDVUE DVC6000 instruments with HART® communication capabilities; and a variety of engineering services.

Production at the new mill begins in March 2007.

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EMERSON™
Process Management

Fisher® Division Plans New Technology Development Center

Emerson Process Management has approved the construction of a new Technology Development Center for the Fisher® division. The new facility will be located at the former Center Street Manufacturing facility in Marshalltown, Iowa—the site where the Fisher Governor Company began its manufacturing operations in 1880. The $19M renovation and expansion project will include world-class flow testing and evaluation capabilities, consistent with the evolving market requirements for control valves and instruments.

Specifically, the new Technology Development Center will include:

- High-pressure flow sub-systems to support continuing research on noise abatement, anti-cavitation, and vibration-resistant designs.
- Quadruple the size of current air and water flow rate capabilities, enabling testing of larger valves for high-pressure applications.
- Flow sciences research lab to duplicate and analyze multi-phase, real-world fluid control problems.
- Dynamic performance test loops
- Customer demonstration area

Terry Buzbee, president of the Fisher division said, “Construction of this facility will allow us to continue to develop innovative control valve technologies that help our customers maximize plant performance.”

When completed, the facility will be the largest and most advanced flow-control research center in the industry.

Construction begins in 2007.

Vue To Success newsletter is cooperatively produced by Fisher® FIELDVUE® Instrumentation groups. It is written primarily for Fisher customers and field sales associates, and distributed as both an electronic and printed piece.

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