

# Potential Plant Shutdown Avoided Using FIELDVUE® Digital Valve Controller

## RESULTS

- Predictive diagnostics helped to warn of a valve packing failure thereby averting a plant shut down.
- Online valve diagnostics enabled personnel to document valve performance which established a baseline for future monitoring and performance trending.



## APPLICATION

Control of feedwater valves in a Westinghouse four-loop pressurized water reactor.

## CUSTOMER

Wolf Creek Nuclear Operating Corporation, Coffey County, Kansas, USA.

## CHALLENGE

Wolf Creek is the only nuclear power plant in Kansas and has been on-line since 1985. It generates 1,200 MW of electricity, which is enough to power approximately 800,000 homes.

In 2005, Emerson's Local Business Partner for the region replaced four obsolete feedwater valve positioners on non-Fisher valves with Fisher DVC6000 Series FIELDVUE® Digital Valve Controllers. The controllers included Performance Diagnostics (PD) and ValveLink® software. This combination allowed personnel to monitor the valve packing friction and plot its performance while in service, plus perform in-depth positioner and valve system diagnostics.

Early in 2007, plant personnel noticed an accumulation of graphite dust on the packing flange of one feedwater valve indicating a problem with the packing. Packing friction acts to stabilize the valve from 'chattering,' which can accelerate packing failure and cause the plant to go off-line unpredictively. Unplanned shutdowns at a nuclear facility of this size can cost in excess of \$1M per day in lost revenue, and this plant was not scheduled for a shutdown until Spring of 2008.

*“Without the capabilities of the DVC6000 positioner, we would have been unable to monitor valve performance as the packing was failing and while it was being repaired on-line. The positioner was able to maintain process control during the packing injection process, something we would not have attempted with our old pneumatic positioner.”*

**Justin Keim**  
Supervisor Engineering



## SOLUTION

The solution proposed by plant personnel to solve the packing issue involved injecting a leak sealant into the valve packing while the valve remained in service. The sealant can extend packing life and enable the plant to maintain operation until the next scheduled outage. The sealant also affects packing friction. Too little friction and the valve will continue to leak and chatter. Too much friction and the valve could lock up risking valve failure and plant shutdown

The DVC6000-Series controller allowed personnel to monitor the degradation of the packing over time. This helped them to determine when to schedule the sealant injection and once injected, confirm that the packing friction was at the correct value. The valve was in service the entire time.

## RESULT

The controller's accurate measurement helped maintain system stability while packing friction dropped from approximately 500 pounds to zero pounds during sealant injection. The controller's fast response kept up with the rapidly changing friction load and heavy chatter during the injection process, which would not have been possible with an analog positioner.

The controllers's online valve diagnostics enabled personnel to document the valve drive signal, valve position, and packing friction levels which established a baseline for future monitoring and performance trending. During the operating cycle, three of four feed-water regulating valves had similar packing failures. Plant personnel successfully used the controller to avoid a potentially costly plant shutdown.

For more information on Emerson Process Management solutions, visit [www.fisher.com](http://www.fisher.com).

© Fisher Controls International LLC 2009 All Rights Reserved.

Fisher, FIELDVUE, and ValveLink are marks owned by one of the companies in the Emerson Process Management business division of Emerson Electric Co. Emerson Process Management, Emerson, and the Emerson logo are trademarks and service marks of Emerson Electric Co. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice. Neither Emerson, Emerson Process Management, nor any of their affiliated entities assumes responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use, and maintenance of any product remains solely with the purchaser and end-user.

### **NORTH AMERICA**

**Emerson Process Management**  
Marshalltown, Iowa 50158 USA  
T 1 (641) 754-3011  
F 1 (641) 754-2830  
[www.EmersonProcess.com/Fisher](http://www.EmersonProcess.com/Fisher)

### **LATIN AMERICA**

**Emerson Process Management**  
Sorocaba, Sao Paulo 18087 Brazil  
T +(55)(15)238-3788  
F +(55)(15)228-3300  
[www.EmersonProcess.com/Fisher](http://www.EmersonProcess.com/Fisher)

### **EUROPE**

**Emerson Process Management**  
Cernay 68700 France  
T +(33) (0)3 89 37 64 00  
F +(33) (0)3 89 37 65 18  
[www.EmersonProcess.com/Fisher](http://www.EmersonProcess.com/Fisher)

### **MIDDLE EAST & AFRICA**

**Emerson FZE**  
Dubai, United Arab Emirates  
T +971 4 883 5235  
F +971 4 883 5315  
[www.EmersonProcess.com/Fisher](http://www.EmersonProcess.com/Fisher)

### **ASIA PACIFIC**

**Emerson Process Management**  
Singapore 128461 Singapore  
T +(65) 6777 8211  
T +(65) 6777 0947  
[www.EmersonProcess.com/Fisher](http://www.EmersonProcess.com/Fisher)

